

TS-950S/SD

SERVICE MANUAL

KENWOOD

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B51-8018-00 ICI 1336

Badge
1B43-1098-04)

Knob
(K29-4512-04) x 4

Knob
(K23-0794-04) x 2

Front glass
(B10-1119-03)

Knob
(K29-4518-04) x 5

Knob
(K29-4514-04) x 3

Knob
(K29-4511-04)

Knob
(K29-4516-04) x 3

Metallic cabinet (Top)*
(A01-)

Knob
(K23-0793-04) x 3



Knob
(K29-4516-04) x 3

Knob
(K21-0788-12)

Foot (Front)
(J02-0424-04) x 2

Knob
(K29-3173-04) x 4

Knob
(K29-4510-04) x 6

Knob
(K29-3172-04) x 3

Knob
(K23-0793-04) x 2

SP metal receptacle
(E06-0858-15)

Phone jack
(E11-0437-05)

Knob
(K29-4514-04) x 2

Knob
(K29-4518-04) x 3

A

Knob (K29-3173-04)	Knob (K29-3192-03)	Knob (K29-3193-03)
Knob (K29-3173-04)	Knob (K29-3194-03)	Knob (K29-3195-03)
Knob (K29-3173-04)	Knob (K29-3196-03)	Knob (K29-3197-03)
Knob (K29-3173-04)	Knob (K29-3198-03)	Knob (K29-3199-03)
Knob (K29-3191-03)	Knob (K29-4501-03)	Knob (K29-4504-03)

B

Knob (K29-3188-03)	Knob (K29-3189-03)	Knob (K29-3190-03)	Knob (K29-3187-03)	Knob (K29-3188-03)
Knob (K29-3200-03)	Knob (K29-3200-03)	Knob (K29-3175-03)	Knob (K29-3176-03)	Knob (K29-3177-03)
Knob (K29-3200-03)	Knob (K29-3200-03)	Knob (K29-3178-03)	Knob (K29-3179-03)	Knob (K29-3180-03)
Knob (K29-3200-03)	Knob (K29-3200-03)	Knob (K29-3181-03)	Knob (K29-3182-03)	Knob (K29-3183-03)
Knob (K29-4502-04)	Knob (K29-4503-04)	Knob (K29-3184-03)	Knob (K29-3174-03)	Knob (K29-3185-03)
Knob (K29-4506-04)	Knob (K29-4509-04)	Knob (K29-4505-04)	Knob (K29-4508-04)	Knob (K29-4507-04)

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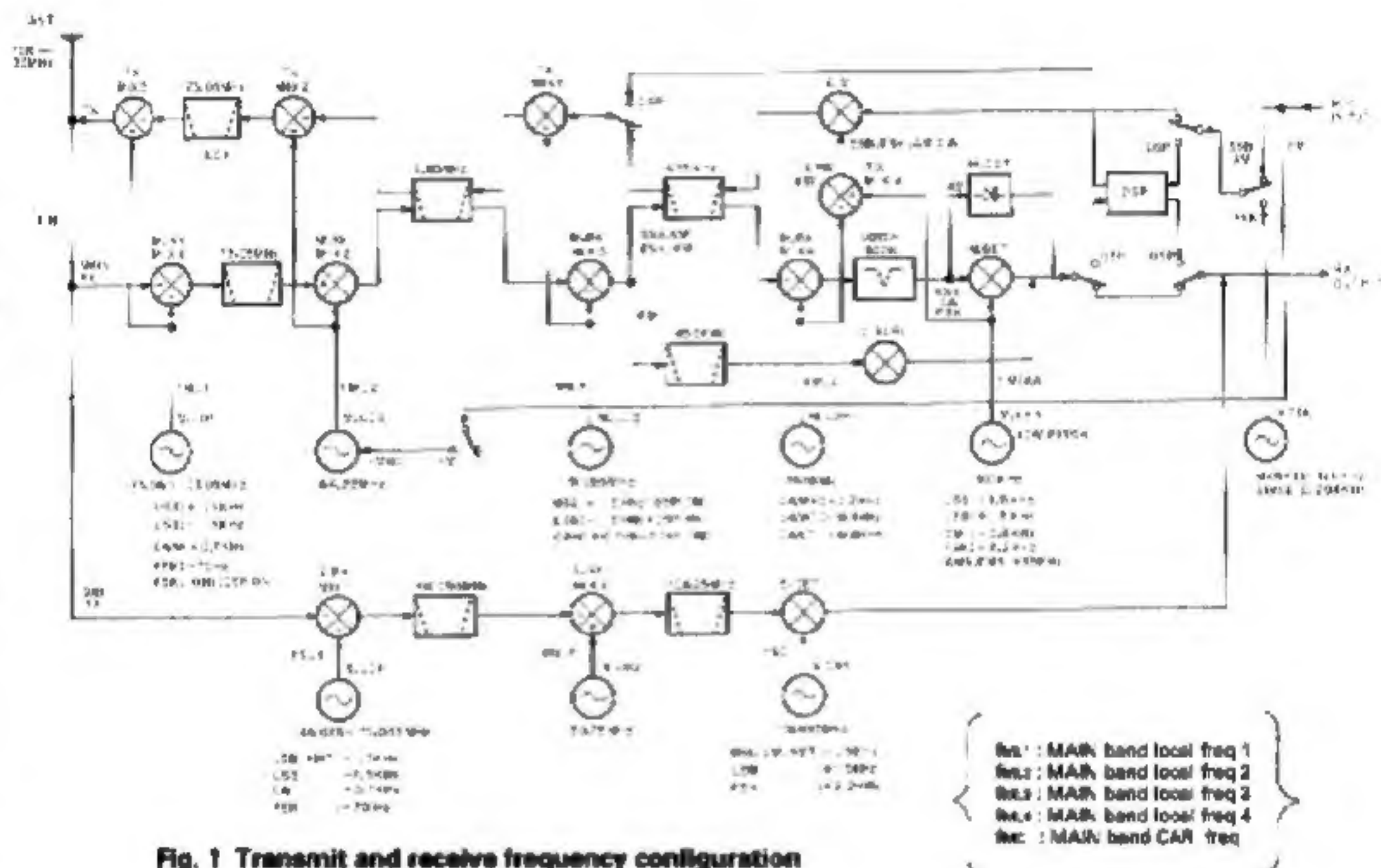
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CIRCUIT DESCRIPTION

Frequency Configuration

The TS-950 utilizes quadruple conversion for SSB, CW, AM, and FSK modes and triple conversion for FM mode. The transmitter utilizes double conversion in CW and FM modes and triple conversion in SSB, AM, and FSK modes.

Receiver and transmitter audio is routed through the Digital Signal Processing Unit when it is installed. This unit supplies either a simple 455 kHz carrier (FM Mode) or a modulated 455 kHz IF frequency in all other modes. Figure 1 shows the transmit and receive frequency configuration.



Main frequency configuration

The equation shown below holds true when the receiver is zero beat.

$$f_{IN} = f_{M1} - f_{M2} - f_{M3} + f_{M4} - f_{M5} \quad (1)$$

Since all these frequencies are generated by the PLL circuit (as shown in Figure 2), the receiver frequency is determined only by the reference f_{STD} and the PLL divide ratio. Therefore, the stability/accuracy of the reference frequency determines the overall frequency stability/accuracy of this transceiver. The stability/accuracy of the reference crystal oscillator used in the TS-950S is ± 0 PPM (-10 to $+50^\circ\text{C}$). The frequency stability is 0.5 PPM (-10 to $+50^\circ\text{C}$) for the TS-950SD or when the optional temperature compensated crystal oscillator (TCXO), SO-1 or SO-2, is used with the TS-950S. When an external reference is used, the stability/accuracy of the transceiver will be determined by that external standard.

The TS-950 local oscillator and the CAR PLL circuits are independent of each other. However, they can be

operated in a manner that is similar to a "cancel loop" configuration by changing the CAR and local oscillator PLL data simultaneously with the microprocessor. This function allows changes in the f_{M1} and f_{M2} lines when the mode changes, and also allows the band width of the VBT and slope tune to be varied (f_{M4} and f_{M3} , f_{M2} and f_{M1}).

When used as a transmitter, the frequency is determined by the reference frequency (f_{STD}) and divide ratio. The display frequencies in the various modes are listed in Table 1. (In the FSK mode, the TS-950, unlike the TS-940, displays the mark transmitter frequency.)

The pitch of the incoming receive signal in the CW mode can be adjusted to suit the operator's preference without changing the center frequency of the transceiver variable CW pitch system. Changes in the receiving pitch are directly related to the transmitter CW sidetone. This results in a easy zero beat procedure for the CW operator.

CIRCUIT DESCRIPTION

Mode	Display frequency
USB, LSB	Carrier peak frequency
CW	Transmit carrier frequency
FSK	Mark transmit carrier frequency
AM, FM	IF filter center frequency

Table 1 Display frequency in each mode

FSK transmission is normally performed in the LSB mode. The audio signal (mark = 2.128 kHz, space = 2.294 kHz) is obtained by dividing the reference frequency fSTD. The F signal is shifted for both transmission and reception so that the mark/space signal passes through the center of the IF filter. The fUL1 signal is shifted in transmit in order to display the mark frequency on the display.

FM transmission is performed directly on the fUL2 signal by using the microphone audio to modulate the VCO9 signal.

For reception in AM and FM modes, the fUL1 line is shifted by the VCO9 signal so that no carrier enters the IF.

When the DSP is connected, the fUL1 and fUL2 lines are used as output signals from the DSP unit in the transmit mode. Mode changes are performed by the fML3 line. The FSK mode differs from the AFSK mode since the signal supplied to the IF unit is obtained from the DSP directly, therefore changes in the signal that would normally be expected due to a change in the mode are not performed. Since the reference frequency applied to the DSP is supplied from the reference oscillator (fSTD) for the main unit, no changes to the operating frequency will occur when the DSP is connected.

• Sub-Receiver frequency configuration

The equation shown below holds true when the receiver is zero beat:

$$f_{IN} = f_{SL1} - f_{SL2} + f_{SC} \quad (2)$$

The crystal oscillator signal (fSL2) is applied to the PLL circuit in order to generate the fSL1 signal. The sub-receiver frequency, like the main receiver frequency stability/accuracy, is determined only by the reference fSTD and the PLL divide ratio. Likewise, when the unit is used for transmission in (the sub receiver is turned off in the AM and FM modes), the frequency stability/accuracy is determined by the reference fSTD and the PLL divide ratio. The display frequencies in the various modes are the same as those described for the main frequency.

Since the sub-receiver works as a transmit frequency monitor, the IF frequency is shifted to that of the main display frequency in the transmit mode. In the AM and FM modes, the IF frequency equals the main IF frequency.

PLL Circuit

The TS-950 PLL circuit consists of a several loops (MLO*, SLO1) that cover a frequency range of 10 kHz to 30 MHz, in 10-kHz steps; a 20-MHz reference oscillator; and a PLL loop that is used to generate other local oscillator frequencies (MLO2 to MLO4) and CAR (MCAR, SCAR) signals. Figure 2 shows the PLL system frequency configuration. Division ratio data for each PLL loop is provided by a microprocessor. Each loop is a single crystal frequency control system where the phase is compared with a unique reference frequency (fREF).

Figure 3 is a PLL block diagram.

• Reference oscillator circuit

The reference frequency (fSTD) used for frequency control is generated by the 20-MHz crystal oscillator X1 and Q*3 (2SC2714). Two outputs are provided, one is used as the reference for the PLL unit, and the other is divided in half by IC*4 (M74LS90P) to produce a 10-MHz signal. This 10-MHz signal is used as the PLL reference signal (fREF) for the CAR unit, and is applied to the AF and DSP units as the PLL reference signal (fREF). The 10-MHz signal is also divided by five in IC14, and then divided in half by IC15 (TC4013BP) to generate a 1-MHz signal.

The reference signal oscillator circuit can be used as VCO (Voltage Controlled Crystal Oscillator) by applying an external reference signal. The 1-MHz signal is divided by 100 in IC13 (MC145888CP) to generate a 10-kHz comparison frequency. The 10-kHz (1 Vp-p) input from the EXT STD passes through amplifier Q12 (2SC2712) and is applied to IC13 where it is then used as the PLL reference signal. It is then compared in the phase comparator in order to lock the reference frequency (fSTD) of OSC1. The internal and external reference frequencies can be controlled by S1. OSC1 can be replaced with the optional SO-1 or SO-2 TCXO. These are controlled by switch S2.

The 20-MHz signal applied to the PLL unit is divided in half by IC9 (SN74LS73AN) to produce a 10-MHz signal. This signal is used as the PLL reference signal (fREF) for the PLL unit and is doubled by Q4 (2SC2714) to produce the 40-MHz reference signal (fREF).

• Main LO1 (PLL unit/AF unit)

PLL3, which is downstream from LO1, generates the 58 to 56MHz VCO3 signal. The 10-MHz reference signal (fREF) is applied to pin 5 of IC2 (CX7925B), and is divided by 5000 internally to produce a 2-kHz comparison frequency. The output from VCO3 is applied to pin 11 of IC2, and is divided by a value determined by N3, and is then compared with the 2-kHz signal in the phase comparator. The frequency of VCO3 is locked

CIRCUIT DESCRIPTION

in 2-kHz steps. Division ratio data (N3) is provided by the digital unit as data (29000 to 28001) which corresponds to 0.00 to 9.99 kHz. When the RIT and XIT are used, the division ratio changes so that the frequency of oscillator VCO3 is shifted according to the setting of the RIT and XIT controls.

The output from PLL3 is divided by 20 in IC3 (M54459L) and is applied to pin 2 of IC4 (SN16913P) of MIX4. MIX4 combines the signal with the 10-MHz signal. The resulting signal passes through the bandpass filter to obtain a signal of 12.9 to 12.8 MHz. It is then applied to pin 2 of IC5 (SN16913P) of MDX3.

PLL2 which is in the center of LO1, generates the 49.5 to 44.5 MHz VCO2 signal. The 10-MHz reference frequency (FREF) is applied to pin 5 of IC6 (CX7925B), and is divided by 100 internally to produce a 100-kHz comparison frequency. The output VCO2 is applied to pin 5 of IC5 of MDX3, where it is mixed with the signal generated by PLL3. The resulting signal passes through the bandpass filter to obtain a signal of 36.6 to 31.7 MHz. This signal is then applied to amplifier Q3 (2SC2714), and then to pin 1 of IC6. This signal is divided by a value determined by N2, and compared with the 100-kHz signal by the phase comparator. The output frequency of MDX3 is locked in 100-kHz steps. Divide ratio N2 is provided by the digital unit as data (366 to 317) which corresponds to 0.00 to 0.49 MHz and 0.50 to 0.99 MHz.

The output from PLL2 is divided by 10 in IC7 (MB467), and is applied to pin 2 of IC8 (SN16913P) of MIX2. MIX2 combines the signal with the 40-MHz signal. The resulting signal passes through the bandpass filter to generate a signal in the range of 35.05 to 35.55 MHz. This signal is applied to buffer amplifier Q6 (2SC2714), and is then routed to the AF unit.

PLL1, which is upstream of LO1, generates the 73.06 to 103.05 MHz VCO1 signal. It consists of four VCOs, Q1 thru Q4 (2SK210x4). The 10-MHz reference frequency (FREF) is applied to pin 5 of IC1 (CXD1225M), and is divided by 20 internally to produce a 500-kHz comparison frequency. The output from VCO1 is amplified by Q33 (2SC2714), and passes through the bandpass filter. One of the output signals is passed through buffer amplifier Q37 (2SC2996) and directed to the RF unit. The other output is applied to pin 5 of IC12 (SN76514N) of MIX1. The signal is then mixed with the signal generated by PLL2 and PLL3. The resulting signal passes through the bandpass filter to produce a signal in the range of 38 to 68 MHz. It then passes through buffer amplifiers Q34 and Q35 (2SC2714x2) and is applied to pin 11 of IC11. This signal is divided by a value that is determined by N1 internally, and compared with the 500-kHz signal by the phase comparator. The output frequency from MIX1 is locked in 500-kHz steps. Divide ratio N1 is provided by the digital unit as data (76 to 136) which

corresponds to 10 kHz to 30 MHz. One of the four VCO1 signals is selected according to the VCO change data supplied by the digital unit.

The final output frequency of the main LO1 signal is 73.06 to 103.05 MHz in 10-Hz steps, and depends on the divide ratio data supplied by N1 to N3. This signal is supplied to the RF unit.

• Main LO2 (AF unit)

In PLL0, Q1 (2SK508NV) of VCO0 is used to generate a signal of 64.22 MHz. The 10-MHz reference frequency (FREF) is applied to pin 5 of IC13 (CXD1225M), and is divided by 500 (2000 in FM mode) internally to produce a 20-kHz (5-kHz in FM mode) comparison frequency. The output from VCO0 is applied to pin 11 of IC13, and is divided by 3211 (12844 in FM mode) internally. It is then compared with the 20-kHz (5-kHz in FM mode) reference signal by the phase comparator to lock the VCO0 frequency. Divide ratio data is supplied by the digital unit.

The output from PLL0 passes through buffer amplifier Q39 (2SC2714) and a low-pass filter and is applied to the IF unit as the main LO2 signal.

• Main LO3 (CAR unit)

In PLL6, VCO6 is used to generate a signal of approximately 71.5 MHz. The 10-MHz reference frequency (FREF) is applied to pin 5 of IC3 (CX7925B), and is divided by 5000 internally to produce a 2-kHz comparison frequency. The output from VCO6 is applied to pin 11 of IC3, and is divided by a value determined by N6 internally, and compared to the 2-kHz reference signal by the phase comparator in order to lock the VCO6 frequency. Divide ratio data N6 is provided by the digital unit. The bandwidth is changed and the carrier point is fine tuned by simultaneously changing the division ratios ($\Delta N6 = \Delta N3$) of PLL6 and PLL3 via microprocessor control.

The output from PLL6 is divided by 100 internally in IC4 (M54459L) and applied to pin 2 of IC5 (SN16913P) of MDX7. In MIX7, it is combined with the 10-MHz reference signal. The resulting signal passes through the ceramic filter CF1 to obtain a signal of 9.285 MHz. The signal is further amplified by Q3 (2SC2714), and then applied to the IF unit as the main LO3 signal.

• Main LO4 (CAR unit)

In PLL5, VCO5 generates a signal of approximately 35.5 MHz. The 10-MHz reference frequency (FREF) is applied to pin 5 of IC1 (CX7925B), and is divided by 5000 internally to produce a 2-kHz comparison frequency. The output from VCO5 is applied to pin 11 of IC1, divided by a value determined by N5 internally, and compared with the 2-kHz reference signal by the phase comparator to lock the VCO5 frequency. Division ratio data N5 is provided by the digital unit. The

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bandwidth is changed and the carrier point is fine tuned by simultaneously changing the division ratios ($\Delta N5 = -\Delta N6$) of PLL5 and PLL6 and ($\Delta N5 = \Delta N3$) of PLL6 and PLL3 via microprocessor control. The division ratios are shifted in CW mode as well.

The output from PLL5 is divided by 100 in IC2 (M54459L) to generate a 355-kHz signal. This signal passes through buffer amplifier Q1 (2SC2712), and is applied to the signaling unit as the main LO4 signal.

• Sub LO1 (PLL unit)

In PLL8, downstream from LO1, VCO8 generates a signal from 109 to 107 MHz. The 10-MHz reference frequency (fREF) is applied to pin 5 of IC10 (CX7925B), and is divided by 5000 internally to produce a 2-kHz comparison frequency. The output from VCO8 is applied to pin 11 of IC10, divided by a value determined by N8 internally, and compared with the 2-kHz signal by the phase comparator locking the VCO8 frequency in 2-kHz steps. Division ratio data N3 is transmitted from the digital unit as data (54500 to 53501) which corresponds to 0.00 to 9.99 kHz. Since the sub receiver section functions as a monitor circuit in the transmit mode, the division ratio is changed so that the VCO8 oscillator frequency is shifted when XIT is used.

The output from PLL8 is divided by 20 in IC11 (M54459L), and is applied to pin 2 of IC12 (SN16913P) of MIX12. MIX12 combines the signal with the 20-MHz reference oscillator signal. The resulting signal passes through a bandpass filter to obtain a signal of 25.45 to 25.35 MHz. This signal is divided by 10 in IC13 (MB467) and is applied to pin 2 of IC14 (SN16913P) of MIX11. MIX11 mixes the signal with the 10-MHz reference signal. The resulting signal passes through a bandpass filter to obtain a signal of 12.545 to 12.535 MHz. This signal is applied to pin 2 of IC15 (SN16913P) of MIX10. MIX10 mixes the signal with the 50.75-MHz signal from the sub LO2. The resulting signal passes through a bandpass filter to obtain a signal of 38.205 to 38.215 MHz. This signal is applied to pin 2 of IC16 (SN16913P) of MIX9.

In PLL7, which is upstream from LO1, VCO7 generates a signal of from 40.065 to 70.065 MHz. It consists of four VCOs, Q1 thru Q4 (2SK210x4). The 10-MHz reference frequency (fREF) is applied to pin 5 of IC17 (CX7925B), and is divided by 1000 internally to produce a 10-kHz comparison frequency. The output from VCO7 is amplified by Q13 (2SC2714), and passes through a bandpass filter. One of the outputs from this filter is applied to buffer amplifier Q14 (2SC2996) and is directed to the RF unit. The other output is applied to pin 6 of IC18 of MIX9. Here the signal is mixed with the signal generated by PLL8 and LO2 OSC2. The resulting signal passes through a low-pass filter to produce a signal of 1.86 to 31.85 MHz. It then passes through buffer amplifiers Q11 and Q12 (2SC2712x2) and is applied to pin 13 of IC17. This signal is divided

by a value determined by N7 internally, and is compared with the 10-kHz reference signal by the phase comparator to lock the MIX9 output frequency in 10-kHz steps. Divide ratio data N7 is provided by the digital unit as data (186 to 3185) corresponding to 10 kHz to 30 MHz. The VCO change data of the four VCO7 VCO's is the same as that of VCO1. The A.LPF uses operational amplifier IC18 (NJM4558SD) and switches the loop constants A to D of VCO7.

The final output frequency of the sub LO1 signal is 40.065 to 70.065 MHz in 10-Hz steps, and depends on the divide ratios N7 and N8, and is applied to the RF unit.

• Sub LO2 (PLL unit)

The LO2 local oscillator signals are generated by the 50.75-MHz crystal oscillator (X1) and Q15 (2SC2714). One local oscillator signal is sent to the sub LO1 PLL loop and is applied to pin 5 of IC15 of MIX10. The other local oscillator signal passes through buffer amplifier Q17 (2SC2714) and a low-pass filter, and is directed to the IF unit as the sub LO2 signal. Local oscillator signals generated by the crystal oscillator circuit are applied to the PLL loop to cancel drift.

• Main and sub CAR (CAR unit)

In PLL4, VCO4 generates a signal of approximately 69.5 MHz. The 10-MHz reference frequency (fREF) is applied to pin 5 of IC6 (CX7925B), and is divided by 5000 internally to produce a 2-kHz comparison frequency. The output from VCO4 is applied to pin 11 of IC6, and divided by a value determined by N4 internally, and compared with the 2 kHz signal with by phase comparator locking VCO4. Divide ratio data N4 is provided by the digital unit. The mode of operation is changed and the carrier point is fine tuned by simultaneously changing division ratios ($\Delta N4 = \Delta N3$) of PLL4 and PLL3 and division ratios ($\Delta N4 = \Delta N8$) of PLL4 and PLL8 with the microprocessor. The division ratios are also shifted when the pitch control is changed in CW mode.

One of the outputs from PLL4 is divided by 100 by IC7 (M54459L) and applied to pin 2 of IC8 (SN16913P) of MIX13. In MIX13, it is combined with the 10-MHz reference signal. The resulting signal passes through ceramic filter CF2 to generate a signal of 10.695 MHz and then passes through amplifier Q5 (2SC2714), and is applied to the signal unit as the sub CAR. The other output is applied to pin 6 of IC10 (SN16913P) of MIX5 and used as part of the main CAR.

In PLL9, VCO9 generates a signal of approximately 59.5 MHz. The 10-MHz reference frequency (fREF) is applied to pin 5 of IC9 (CX7925B), and is divided by 5000 internally to produce a 2-kHz comparison frequency. The output from VCO9 is applied to pin 11 of IC9, divided by a value determined by N9 internally, and compared with the 2-kHz signal in the phase com-

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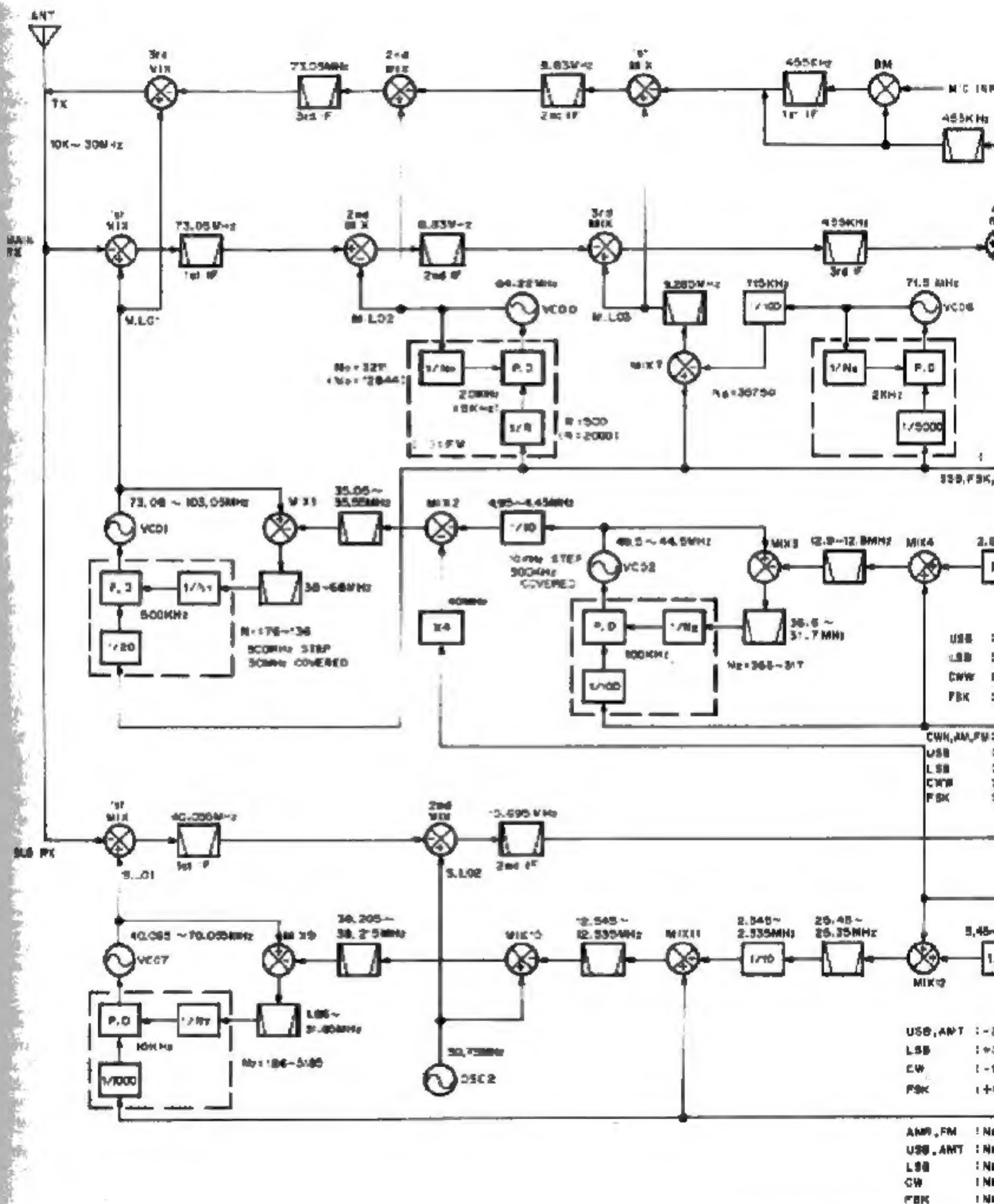
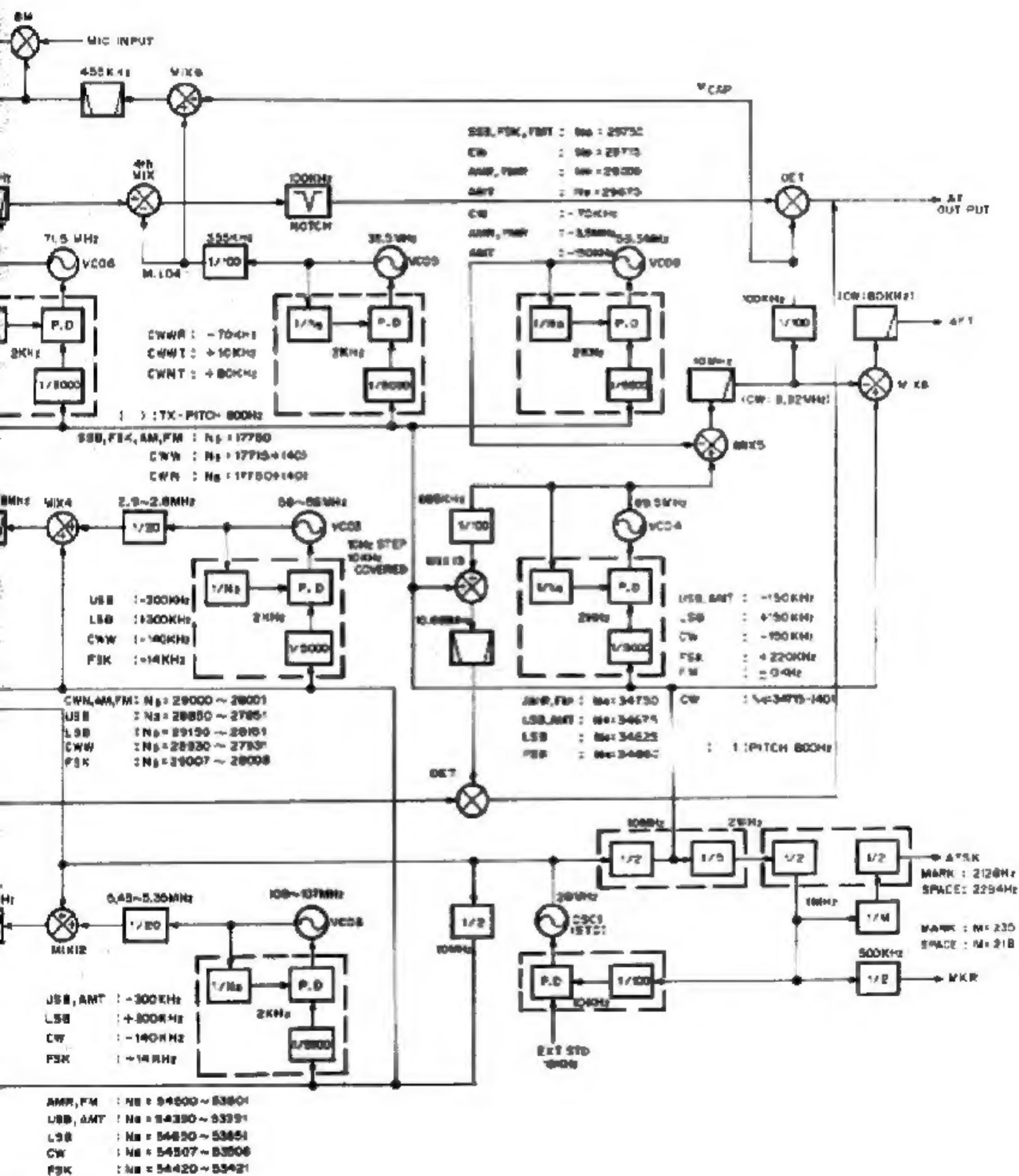


Fig. 2 PLL system frequency c

/SD TS-950S/SD
CUIT DESCRIPTION



DESCRIPTION



Fig. 3 PLL block diagram



CIRCUIT DESCRIPTION

parator locking the VCO9. Divide ratio data N9 is provided by the digital unit. Division ratios are changed in CW, AM, and FM modes so that the VCO9 frequency is shifted as required.

The output from PLL9 is applied to pin 10 of MIX5. Here it is mixed with the output from PLL4, and passes through a low-pass filter to produce a 10-MHz (9.92-MHz in CW mode) signal. One output from PLL9 is divided by 100 by IC 2 (M54459) to generate a 100-kHz (99.2-kHz in CW mode) signal. The signal passes through buffer amplifier Q11 (2SC2712) and is applied to the signal unit as the main CAR.

The other output is applied to pin 2 of IC 11 (SN 6913P) of MIX8. MIX8 combines 1 with the 10-MHz reference signal. The signal passes thru a low-pass filter and is then converted to the 80±50-kHz A-F signal used by AF V3 in the CW mode. It then passes through buffer amplifier Q10 (2SC2712) and is applied to the A-F unit.

• Marker signal and AFSK signal

The 1-MHz signal generated by the reference oscillator circuit of the CAR unit is applied to the MKR module and divided in half internally. The 500-kHz harmonic signal is then applied to the RF unit whenever the calibration (CAL) switch is turned on.

The 1-MHz signal is applied to programmable divider IC 8 (MC14589BCP). The divides ratio of IC18 is interlocked with the mark/space condition of the RTTY key jack, and switched between 235/218. The actual shift width is controlled by the decoder output from Q17 (TC4568B) and the SFT module according to the SE data provided by the digital unit.

The output from IC18 is applied to IC15 (TC40138P) and divided in half to make a duty ratio of 50%. This output is connected to the microphone amplifier circuit of the signal unit through the A.F. of Q9 (2SA1162) to become the AFSK modulation signal. IC 8 operation is halted in modes other than FSK mode, resulting in no AFSK signal.

Item	Rating
Nominal center frequency	3.285MHz
3dB attenuation bandwidth	±50kHz or more at 3.285MHz
Guaranteed attenuation	40dB or more at 8.33MHz (1-40kHz) 40dB or more at 3.74MHz (1-40kHz) 40dB or more at 18.715MHz (1-40kHz)
Insertion loss	5dB or less Formula = $20 \log \left(\frac{E}{2E} \right)$
Ripple	1.0dB or less within 3dB band
Input and output impedance	330Ω
Voltage capacity	50V DC (1 minute)

Table 2 Ceramic filter (L72-0358-05) (CAR unit CF1)

Item	Rating
Center frequency f ₀	With ±1°C 700MHz ± 50kHz (The center frequency must be the center of the 3dB band)
3dB attenuation bandwidth	With in 150 ± 40kHz
25dB attenuation bandwidth	380kHz or less
Insertion loss	With in 8.0dB Formula = $20 \log \left(\frac{E}{2E} \right)$
Ripple within 3dB band	1.0dB or less
Spurious attenuation (9 to 12MHz)	38dB or more
Voltage capacity (between pins)	50V DC (1 minute)
Input and output impedance	330Ω

Table 3 Ceramic filter (L72-0369-05) (CAR unit CF2)

Receiver Circuit Configuration

(Refer to block diagram on page 265, 266 and 267.)

The incoming receive signal from the antenna is passed through the transmit/receive selector circuit on the filter unit (X61-3080-XX). The signal is routed to the RX ANT OUT (PCA jack on the rear panel, and is applied to the RF unit (X44-3'00-00) ANT terminal through the rear cable. This signal is applied to the receiver bandpass filter through the RF attenuator (0 to 30 dB selectable via relays K1 and K2 and the low-pass filter (30 MHz). The bandpass filter divides the receiver frequency range (up to 30 MHz) into 15 bands. The appropriate section is automatically selected by RX bandpass filter control data (RB0, 1, 2, 3) that is supplied from the digital unit (X48-3050-XX).

RX frequency (MHz)	RX BPF Data			
	RB3	RB2	RB1	RB0
0.0 - 0.5	1	0	0	1
0.5 - 1.0	0	1	0	0
1.0 - 3.0	0	0	1	1
3.0 - 4.0	0	1	1	0
4.0 - 7.0	0	1	1	1
7.0 - 7.5	1	0	0	0
7.5 - 10.0	0	1	0	1
10.0 - 10.5	1	1	1	0
10.5 - 14.0	1	0	1	0
14.0 - 14.5	0	0	0	0
14.5 - 18.0	1	0	1	1
18.0 - 21.0	1	1	0	0
21.0 - 21.5	0	0	0	1
21.5 - 24.5	1	1	0	1
24.5 - 30.0	0	0	1	0

Table 4 RX BPF selection data

The signal from the bandpass filter passes through the RF AGC circuit composed of PIN diodes D37 and D38 (1M204). It is then amplified by the RF amplifiers Q5 (2SK125-5) and Q6 (2SK520). (When AIF is on, the signal is directed to RF buffer amplifier Q4 (2SK125) with unity gain, not to RF amplifiers Q5 and Q6.) The amplified signal is separated by L70 for use in the main 11 and sub channels.

CIRCUIT DESCRIPTION

The main received signal passes through buffer amplifier Q12 (2SK520) and a low-pass filter and is then mixed with the VCO signal in the first mixer Q13 to Q16 (2SK520). The output is converted into the first IF signal of 73.05 MHz. This signal is applied to the IF unit (X4B-3060-00) from the MIF terminal (CN6) and is separated into two separate channels. One of the channels passes through the buffer amplifier Q23 (2SC2714) and is combined with the HET signal (64.22 MHz) in mixer Q24 (3SK131) to generate an 8.83-MHz wide-band signal. This signal is routed from the rear as IF OUT*, and is used as a signal for the panoramic display section of the SM-230 station monitor. The other signal passes through buffer amplifier Q44 (2SK520). Undesirable signal components are eliminated from the signal when it passes through the Monolithic Crystal Filter (MCF) XF2 with a bandwidth of 15-kHz. The signal is then applied to the second mixer Q15 and Q16 (2SK520), mixed with the HET signal (64.22 MHz), and converted into the second IF signal (6.83 MHz). This signal is also separated into two channels: one is supplied to the noise blanker or the AF unit (X49-3020-00), and the other is applied to the second F signal filter circuit via the noise blanker gate composed of diodes D5 to D8 (1ALS135).

This filter circuit utilizes wide-band LC filters L28 and L29, a 6-kHz MCF, and a 2.7-kHz MCF (XF3). The filter circuit permits the use of several optional filters (1.8-kHz and 500-Hz or 250-Hz). (The TS-950SD has these filters included as standard equipment.) These filters can be selected from the front panel via C8 (IC9174F) of the signal unit (X57-3380-00).

The received signal from the second F filter, is applied to the third mixer Q19 and Q20 (3SK131) where it is mixed with the HET signal (9.285 MHz). The resulting signal is then converted to the third IF signal (455 kHz) and is routed to the signal unit via the TR455 terminal (CN17).

This 455-kHz signal is then separated into two channels, FM and non-FM. In FM, the signal is amplified by Q1 (3SK131) and applied to the third IF filter circuit. This filter circuit utilizes a 6-kHz ceramic filter (CF1) and 2.7-kHz ceramic (crystal for the TS-950SD) filter (CF101). Two optional filters are available for this circuit, a 500-Hz and a 250-Hz. (The TS-950SD type has these filters included as standard equipment.) These filters, like the filters for the second IF, may be selected from the front panel under the control of IC8.

Filter Mode	2nd F filter 8.83-MHz	3rd IF filter 455-kHz
Non-FM	All filters (including LC filter)	Excluding 12 kHz
FM	No display LC filter only	12 kHz or 6 kHz

Table 5 Selection of filters by mode (option)

Filter Mode	8.83-MHz	455-kHz
SSB CW, *SK	2.7-kHz	2.7-kHz
AM	6-kHz	6-kHz
FM	-LC filter	12-kHz

Table 6 Initial setting

Mode	2nd F filter type	3rd IF filter type
SSB	○ LC filter	○ 10-1
6 kHz	○ JVC U1-320E-05	○ 10-1
2.7 kHz	○ JVC U1-322E-05	○ 10-1
8 kHz	△ JVC solid core	△ 10-1
500 Hz	△ Crystal YK-68C-11	○ 10-1
250 Hz	△ JVC solid core	X
455 2 kHz-FM only	○ Ceramic UZ-3015-05	○ 10-1
6 kHz	○ Ceramic UZ-3018-05	○ 10-1
2.7 kHz	○ Ceramic UZ-3033-05	○ Crystal YG-4005-11
500 Hz	△ Crystal YG-450C-11	○ 10-1
250 Hz	△ Crystal YG-4005-11	○ 10-1

* Only one of them is selectable.

○ Standard

△ Option

X Not available

Table 7 Filters by type

The 455-kHz signal from the third IF filter is amplified by Q2 (3SK131) and is mixed with the CAR signal (355 kHz) in the fourth receive mixer Q3 (3SK131). The signal is converted into the fourth IF signal of 100 kHz, and passes through the notch filter circuit, and is then applied to Q4 (3SK131). The amplified output from Q4 becomes the AF signal after passing through the SSB/CW detector, and is applied to the SCAF terminal (CN7).

The output of Q2 is applied to Q22 (2SC2712), to become the squelch signal for non-FM receive modes by comparator IC2 (NJM2903M). The output of Q4 is also applied to Q10 (2SC2712) to produce the Automatic Gain Control (AGC) signal.

In the FM mode, the 455-kHz signal passes through IF buffer amplifier Q25 (2SC2712), and is applied to the third IF circuit. Either wide-band filter CF2, for a 12-kHz bandwidth, or narrow-band filter CF3, for a 6-kHz bandwidth, may be selected. The output is amplified by limiter amplifiers IC6 and IC7 (μPC577H), and then FM-detected by ceramic discriminator CF4.

The noise components, at approximately 40 kHz, are eliminated from the FM detector output, and a squelch circuit consisting of noise amplifier Q19 and Q20 (2SC2712) and comparator IC2 (b2) produces an FM squelch control signal.

CIRCUIT DESCRIPTION

The FM AF signal passes through the de-emphasis circuit, and is then amplified by the FM AGC amplifier (C3 μ PC1158H2). If the deviation of the ANT input is 3 kHz or more, the circuit keeps the audio output constant and prevents large changes in volume. The FM AF signal and the AM AF signal detected by C2* and D22 (R-573) are routed from the FAAF terminal.

The AF signal from the SCAF or FAAF terminal is applied to the AF unit (X49-3020-00). The AF signal from the SCAF terminal is routed differently from the signal from the FAAF terminal. The signal from the SCAF terminal is processed by the DSP and CVV VBT circuit, and is then applied to the AF amplifier (C7 α /2). The signal from the FAAF terminal is applied directly to the AF amplifier (C7 α /2).

The sub receiver signal passes through buffer amplifier Q7 (2SK520) and the low-pass filter of the RF unit. The signal is mixed with the sub VCO signal in the first sub mixer Q6 to Q11 (2SK520), and the output is converted into the first sub IF signal of 43.065 MHz. The unwanted signal components are eliminated from the signal when it passes through the MCF XF1 with a 15-kHz bandwidth. When the monitor is on, the RF transmit signal is applied to the first sub mixer.

The signal applied to the IF unit from the SUB IF terminal (Ch 7) is amplified by Q1 (3SK13*), mixed with the -ET signal (50.7 MHz) in mixer Q2 and Q3 (2SK520), and converted to the second IF signal (13.695 MHz). This signal is separated into two channels; one is supplied to the noise blanker circuit, the other is amplified by the second IF amplifier Q5 (3SK13*), which also acts as a noise blanking gate, and passes through the 13.695-MHz crystal filter XF1. The signal is further amplified by the second IF amplifiers Q9 and C10 (3SK13*), product-detected by IC1 (AN612), and routed from the SAF terminal (Ch 15) as an AF signal.

The sub AF signal is applied to the AF unit, where it is separated into two channels; one for sub reception and one for the monitor. For sub reception, the signal is applied to IC7 (α /2). For the monitor, the signal is routed to the monitor VR.

The main AF and sub AF signals are amplified separately by IC7, passed through the muting circuit Q8 and Q9 (2SD1757K), and are applied to the main and sub AF VR. In the CVV mode, the sub AF can also be routed through the AF VBT circuit.

The AF signal that has passed through the AF VR is mixed with the signal that has passed through the monitor VR in IC8 (α /2, NJM4556M). The resulting signal is amplified and applied to the control unit (X53-3230-00) via the AF terminal (CV1*), and amplified by the AF power amplifier (C7 μ PC2002V) in order to drive the speaker.

• Filters ratings

Item	Rating
Nominal center frequency	6.830MHz
3dB attenuation	± 50 dB or more at 6.830MHz
Guaranteed attenuation	55dB or more at 3.285MHz ± 45 kHz 45dB or more at 3.74MHz ± 91 kHz
Insertion loss	6dB or less Formula = $20 \log \left(\frac{E_1}{2.2E} \right)$
Ripple	1.0dB or less (within 3dB band)
Input and output impedance	300 Ω

Ceramic filter (L72-0351-05) (IF unit CF1)

Item	Rating
Nominal frequency	10.695MHz
Center frequency deviation	Within ± 20 kHz at 6dB
Passband width and attenuation bandwidth	± 2 kHz or more at 6dB ± 5 kHz or less at 20dB ± 2 kHz or less at 80dB
Ripple	2dB or less
Insertion loss	0dB or less
Guaranteed attenuation	60dB or more within ± 40 kHz
Input and output impedance	1 k $\Omega \pm 5\%$ / 5pF $\pm 5\%$

MCF (L71-0249-05) (IF unit XF1)

Item	Rating
Nominal center frequency	73.05MHz
Pass bandwidth	± 7.5 kHz or more at 3dB
Attenuation bandwidth	± 30 kHz or less at 40dB
Ripple	1.0dB or less
Insertion loss	3.0dB or less
Guaranteed attenuation	70dB or more at 10 \pm (50 to 100) kHz; 70dB or more at 10 \pm (20 to 100) kHz
Center frequency deviation	Within ± 1 kHz at 3dB
Input and output impedance	2k $\Omega \pm 10\%$

MCF (L71-0401-05) (IF unit XF2)

Item	Rating
Nominal center frequency	6830kHz
Center frequency deviation	Within ± 150 Hz at 6dB
Passband width	± 1 kHz or more at 8dB
Attenuation bandwidth	± 1 kHz or less at 20dB ± 2 kHz or less at 60dB ± 3 kHz or less at 80dB
Ripple	2dB or less
Insertion loss	6dB or less
Guaranteed attenuation	80dB or more in the range ± 3.4 kHz to ± 1 MHz
Input and output impedance	500 Ω / 15pF

MCF (L71-0222-05) (IF unit XF3)

CIRCUIT DESCRIPTION

Item	Rating
Nominal center frequency	455 ± 0.2kHz
6dB bandwidth	2.8 to 3.2kHz
60dB bandwidth	4.7kHz or less
Guaranteed attenuation	80dB or more at 0.1 to 10kHz
Spurious	-40dB or more at 500 to 700kHz
Ripple in 6dB band	2dB or less
Insertion loss	6dB or less
Guaranteed attenuation	80dB or more within ±40kHz
Input and output impedance	2kΩ

Ceramic filter (L72-0333-05) (Filter unit CF1)

Item	Rating
Nominal center frequency	455kHz
6dB bandwidth	±6kHz or more at 45kHz tilt
60dB bandwidth	±12.5kHz or less at 45kHz tilt
Ripple (within 455 ± 4kHz)	3dB or less
Insertion loss	6dB or less
Guaranteed attenuation (within 455 ± 100kHz)	35dB or more
Input and output impedance	2.0kΩ

Ceramic filter (L72-0315-05) (Signal unit CF2)

Item	Rating
Nominal center frequency (Hz)	8830kHz
Pass bandwidth	f ₀ ± 3.0kHz or more at 5dB
Attenuation bandwidth	f ₀ ± 18.0kHz or less at 60dB f ₀ ± 13.0kHz or less at 50dB
Guaranteed attenuation	70dB or more within f ₀ ± 1MHz
Ripple	Within 1.5dB
Insertion loss	Within 1.5dB
Input and output impedance	850Ω / 2pF

MCF (L71-0286-05) (Filter unit XF1)

Item	Rating
Nominal center frequency (kHz)	40.055MHz ± 0.73kHz or less and deviation
Pass bandwidth	f ₀ ± 7.5kHz or more at 3dB
Attenuation bandwidth	30dB or more at f ₀ ± 75kHz 60dB or more at f ₀ ± 150kHz Spurious: 30dB or more
Guaranteed attenuation	60dB or more at f ₀ ± 50kHz to f ₀ ± 100kHz
Ripple	1.5dB or less
Insertion loss	4dB or less
Input and output impedance	4.2kΩ / 10pF

MCF (L71-0275-05) (RF unit XF1)

Item	Rating
Nominal center frequency	455kHz
6dB bandwidth	±3kHz or more (at 45kHz tilt)
60dB bandwidth	±8kHz or less (at 45kHz tilt)
Ripple (within 455 ± 2kHz)	2dB or less
Insertion loss	6dB or less
Guaranteed attenuation (within 455 ± 100kHz)	60dB or more
Input and output impedance	2.0kΩ

14 Ceramic filter (L72-0319-05) (Signal unit CF1, 3, 5)

Item	Rating
Nominal center frequency	5830.0kHz
Center frequency deviation	Within ±70Hz at 6dB
Pass bandwidth	±250Hz or more at 6dB
Attenuation bandwidth	±500Hz or less at 60dB
Guaranteed attenuation	80dB or more within ±2kHz to ±1MHz
Ripple	2dB or less
Insertion loss	Within 5 ± 2dB
Input and output impedance	600Ω / 15pF

Crystal filter VK-88C-1 (L79-0847-05) · Option

Item	Rating
Nominal center frequency	455kHz
Center frequency deviation	Within 50Hz at 6dB
Pass bandwidth and Attenuation bandwidth	±250Hz or more at 6dB ±425Hz or less at 60dB
Guaranteed attenuation	80dB or more within 0.2Hz to 45kHz 80dB or more within 455kHz to 2MHz
Ripple	2.5 or less
Insertion loss	6dB or less
Input and output impedance	2kΩ ± 5% / 15pF ± 5%

Crystal filter YG-455C-1 (L79-0888-05) · Option

Item	Rating
Nominal center frequency	455kHz
Center frequency deviation	Within 50Hz at 6dB
Pass bandwidth and Attenuation bandwidth	±125kHz or more at 6dB ±250kHz or less at 60dB
Guaranteed attenuation	80dB or more within 100Hz to 455kHz 80dB or more within 455kHz to 2MHz
Ripple	2dB or less
Insertion loss	6dB or less
Input and output impedance	2kΩ ± 5% / 15pF ± 5%

Crystal filter YG-455CN-1 (L71-0239-05) · Option

Item	Rating
Nominal center frequency	455kHz
Pass bandwidth and Attenuation bandwidth	±2kHz or more at 6dB ±5kHz or less at 20dB ±2.05kHz or less at 60dB ±2.1kHz or less at 66dB
Guaranteed attenuation	80dB or more within ±20kHz
Ripple	3dB or less
Insertion loss	6dB or less
Input and output impedance	2kΩ ± 5% / 50pF ± 5%

Crystal filter YG-455S-1 (L71-0292-05) · Option

CIRCUIT DESCRIPTION

• SLOPE-TUNE, IF VBT

Figure 4 shows the TS-950 SLOPE-TUNE and IF VBT receiver configuration.

The operating principle of SSB-SLOPE-TUNE circuit is explained first. When f_{ML1} , f_{ML3} , and f_{ML4} in Figure 5 are at their normal frequencies, the synthesized bandwidth is indicated by A. When the frequencies of f_{ML3} and f_{ML4} are lowered by an amount equal to Δf_1 , only the third IF filter (456-kHz band) shifts to position B. (The circuit is designed so that the PLL data lowers the frequencies of f_{ML3} and f_{ML4} equal to the value determined by Δf_1 .) The synthesized bandwidth is the overlapping portion of A and B. When the frequencies of f_{ML1} and f_{ML3} are lowered by an amount equal to Δf_2 , only the second IF filter (8.83-MHz band) shifts to position C. The synthesized bandwidth is the over-

lapping portion of B and C. The SSB-SLOPE-TUNE allows these operations to be conducted independently, using two separate controls.

The frequencies are generated by the PLL circuit and controlled by the microprocessor. The amount of change in Δf_1 and Δf_2 is digitally tracked, allowing only the bandwidth to narrow without changing the center frequency of the composite passband.

We will now cover the operating principle of the SSB-SLOPE-TUNE circuits. These circuits are designed so the relationship between the frequency changes of PLL data are such that $\Delta f_2 = \Delta f_1$. The synthesized passband widths of the third IF filter (f_{IF3}) and the second IF filter (f_{IF2}) can thus be varied by a single control.

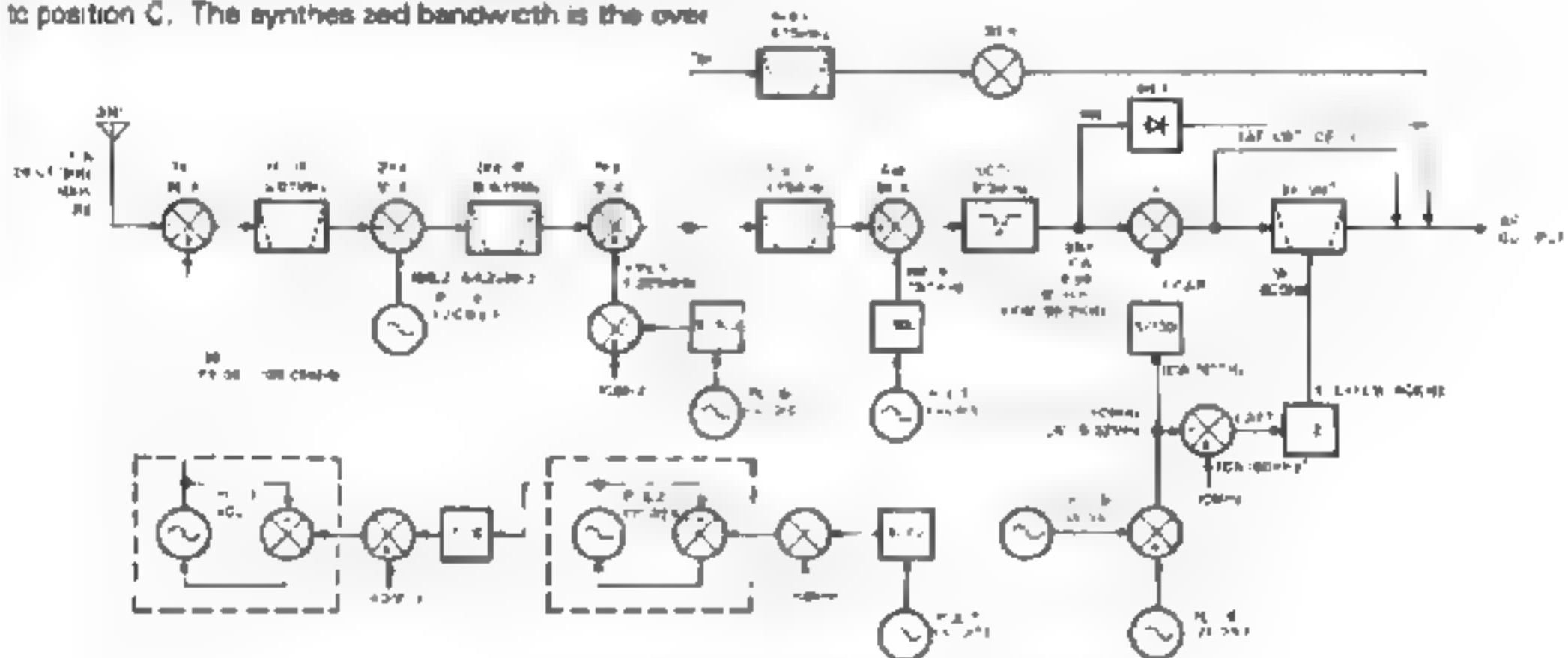


Fig. 4-a Main receiver frequency configuration

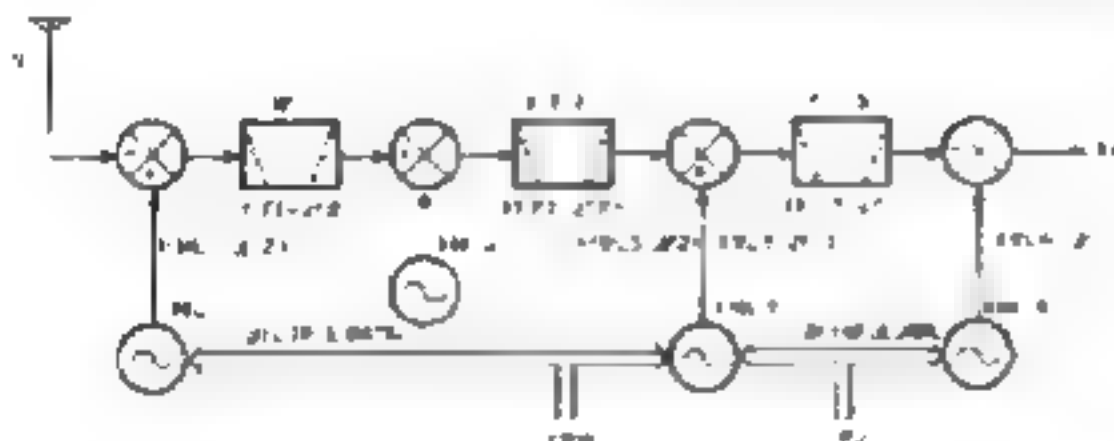


Fig. 4-b Band variable frequency configuration

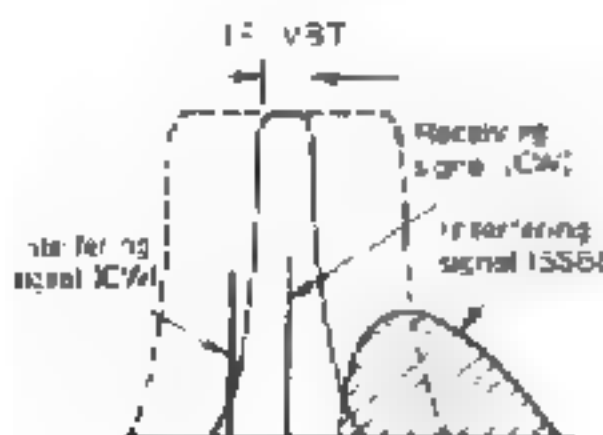


Fig. 4-c IF VBT

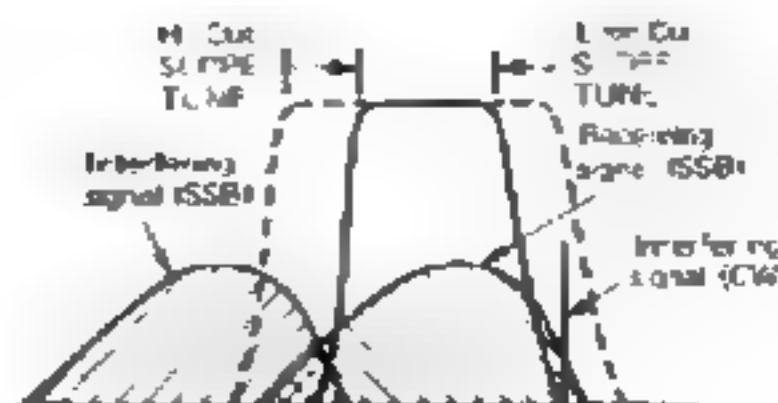


Fig. 4-d SSB-SLOPE-TUNE

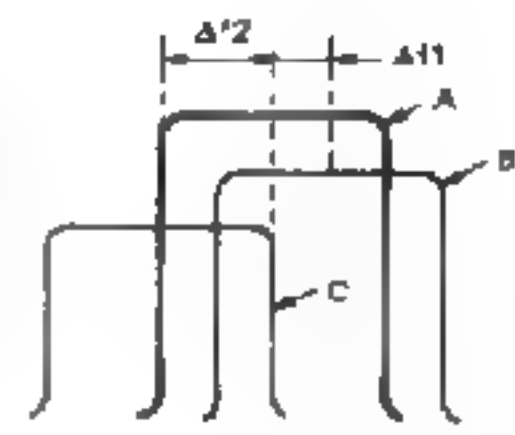


Fig. 5

CIRCUIT DESCRIPTION

• Noise blanker circuits

1) NB1

NB1 is a noise blanker circuit that has been designed for short-duration pulse noise, such as automobile ignition noise. The 8.83-MHz IF signal generated from the first main IF of 73.05 MHz is amplified by noise amplifiers Q40 (2SK210), Q41, Q42, and Q44 (2SC2712), passes through buffer amplifier Q45 (2SC2712), and is noise-detected by D30 (HSM88AS). This signal is used to switch Q47 (2SC2712), turns on Q48 (DTA124EK), and switches the main IF signal line according to the incoming noise pulses. The signal is also used to turn on Q49, which turns on IF unit Q5 and Q6 (2SC2712), and switches the sub IF signal according to the main noise.

The 10.695-MHz IF signal generated from the first sub IF of 40.055 MHz is amplified by noise amplifiers Q26 (2SK210), Q27, Q28, and Q29 (2SC2714) of the IF unit, passes through buffer amplifier Q31 (2SC2714), and is noise-detected by D33 (HSM88AS). This signal is used to switch Q33 (2SC2712), turns on Q34 (DTA124EK), switches Q5 and Q6, and switches the sub IF signal line according to the incoming noise. The signal turns on Q34 (DTA124EK), and switches the main IF signal line according to the sub noise.

When NB1 turns on, a DC voltage is applied to the emitter of Q47 on the AF unit from threshold variable resistor VR12 for the main receiver. A corresponding DC voltage is applied to the emitter of Q33 on the IF unit from threshold variable resistor VR12 for the sub receiver. The effect of the NB circuit can be adjusted by changing these emitter voltages.



NB2 is a noise blanker circuit that is used to blank noise pulses with a comparatively long duration and a large pulse width, like the Russian woodpecker.

For the main receiver NB2 circuit, the noise signal amplified by noise amplifiers Q40, Q41, Q42, and Q44 of the AF unit is noise-detected by D28 (HSM88AS) in a manner very similar to that of NB1. The threshold voltage of emitter Q46 (2SC2712) is varied by VR12. The output from Q46 enters the NB2 module unit (X59-3350-00) and is used to generate the pulse width and period synchronized with the woodpecker noise.

For the sub receiver NB2 circuit, the noise signal amplified by noise amplifiers Q26, Q27, Q28, and Q29 is noise-detected by IF unit D32 (HSM88AS) in a manner very similar to that of NB1. The threshold voltage of emitter Q32 (2SC2712) is varied by VR12. The output from Q32 enters the NB2 module unit (X59-3350-00) and is used to generate the pulse width and period synchronized with the woodpecker noise.

The NB2 switching signal detected by the main IF, and the NB2 switching signal detected by the sub IF switch the main and sub IF signal lines in a manner very similar to NB1.

IC1 (TC4011B), 1/4, 4/4, and 2/4, 3/4 in the module unit are set to a pulse width of 40 ms. Normally, woodpecker noise has a pulse width of 3 to 4 ms and a period of from 80 to 100 ms. Some woodpecker noises have a period of about 50 ms, although this is rare. Therefore, even a woodpecker noise signal, with a large pulse width can be blanked by switching the noise in 5-ms intervals. However, if a noise signal, with a period of several ms like an ignition noise is blanked at a 5 ms interval, the signal receive time becomes zero. To prevent this, a one-shot multi-vibrator composed of IC1 2/4 and 3/4 is provided so that the next pulse is not blanked for a period of 40 ms after the one shot is issued from 1/4 and 4/4.

CIRCUIT DESCRIPTION

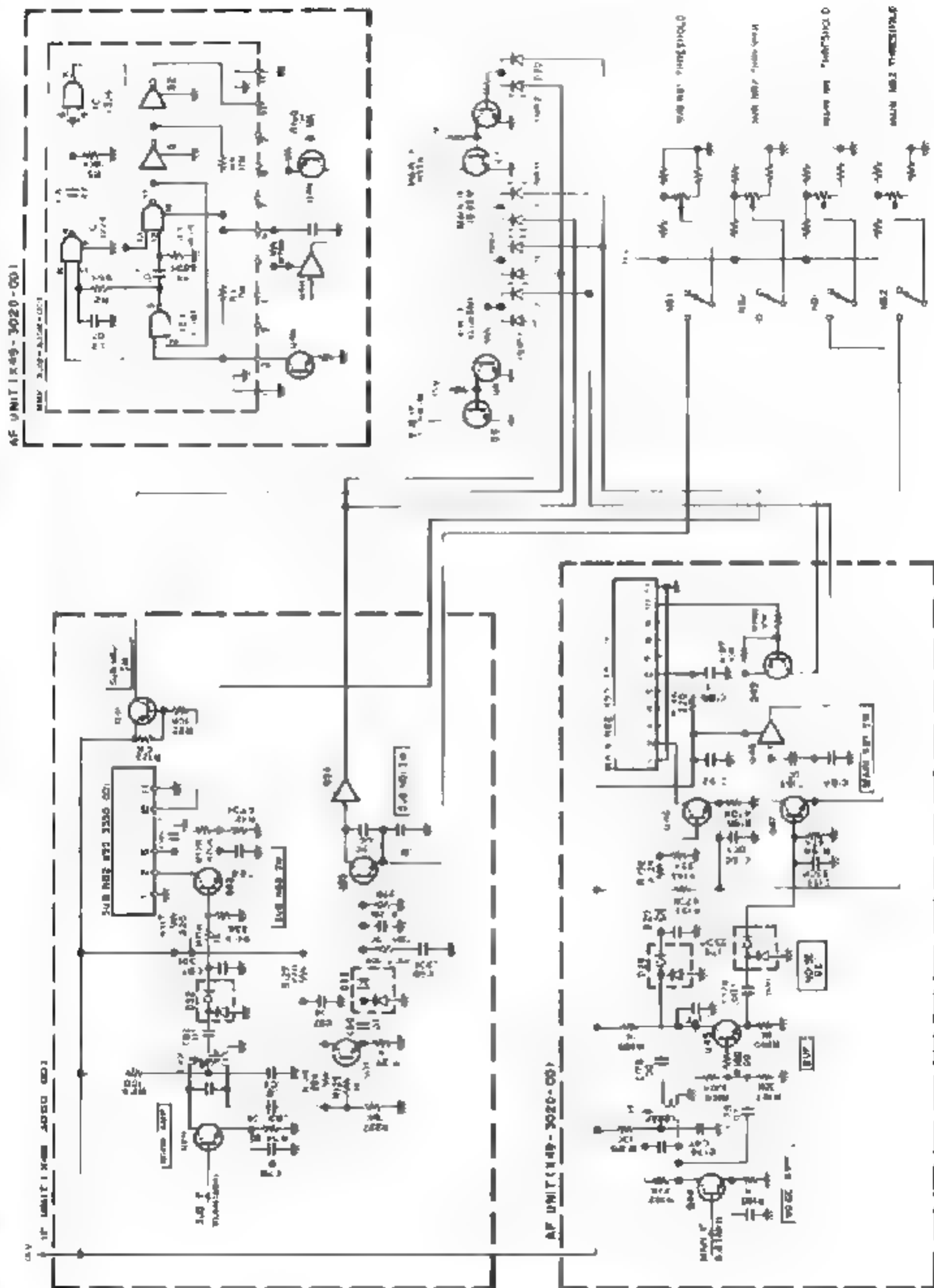


Fig. 6 Noise blaster circuit configuration

CIRCUIT DESCRIPTION

Transmitter Circuit Configuration

The transmitter system configuration is shown in Figure 7. The transmitter system operates as a triple conversion system in SSB, CW, and AM modes, and as a double conversion system in FM mode.

The audio signal from the microphone enters switch unit (A) (D/10) and switch unit (A) (H/10) from the microphone connector board. The signal is amplified by the MIC AMP module and passes through buffer amplifier Q17 (2SC2712) and splits into the SS3/AM MIC system, and the FM, VOX system. Inputs from the rear panel enter from the PHONE IN and ACC2 lines on the IF unit, are amplified by Q42 (2SC2712), and then matched with the input of Q17 on the switch unit (A) (H/10).

The SSB and AM MIC system of switch unit (A) (H/10) is routed to the MIC GAIN VR and the PROC IN VR on the same board. When the speech processor is turned on, with switch S59 of switch unit (A) (G/10) PROC IN is selected. When the speech processor is turned off, the MIC GAIN output is selected.

The FM and VOX signals of switch unit (A) (H/10) are switched to the FM and VOX systems by switch unit (A) (E/10). The FM signal enters the FM VCA MP

circuit of the AF unit, and the VOX signal enters the VOX circuit of the AF unit via the VOX GAIN VR of switch unit (A) (E/10).

The SSB and AM MIC signals enter the signal unit and are amplified by C9 (TA7140P) to a level sufficient for modulation, and are then modulated by ring modulator D41 (ND487R1-3R) to produce a 455-kHz DSB signal. In the AM and CW modes, D41 is used as a carrier attenuator by applying DC bias to D41. The carrier level is adjusted by changing the level of VR11 CAR LEVEL VR on switch unit (A) (J/10). In the FM mode, the carrier level is set by VR8 (FMC) on the signal unit.

The DSB signal is amplified by Q12 (3SK131) on the signal unit, and is passed through ceramic filter CF101. The unwanted side band is eliminated in order to generate a 455-kHz SSB signal. The FM and FSK signals also pass through CF101. The CW and AM signals pass through CF1. The 455-kHz signal passes through buffer amplifiers Q26 and Q25 (2SC2712x2), and are routed from the signal unit.

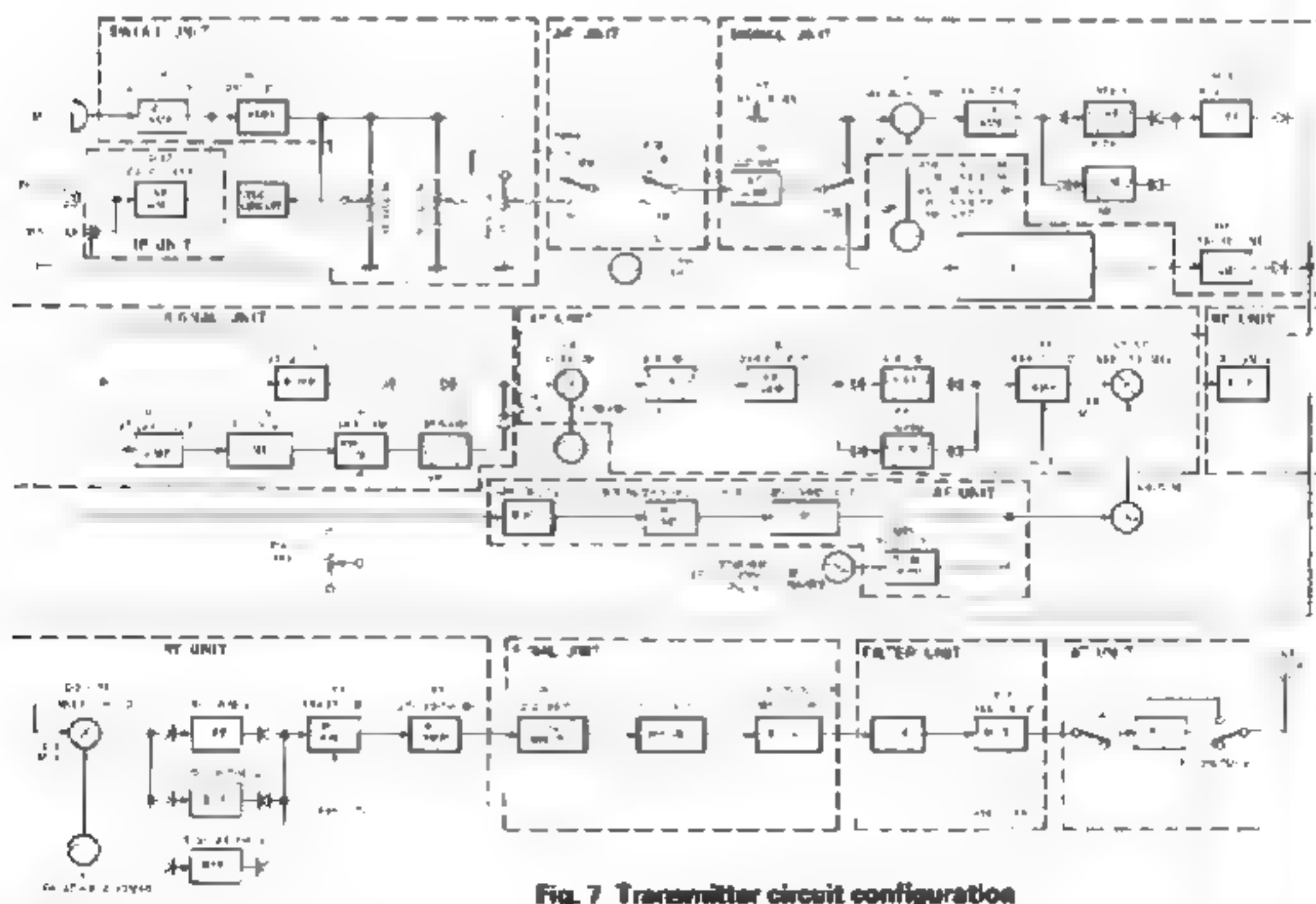


Fig. 7 Transmitter circuit configuration

CIRCUIT DESCRIPTION

The speech processor can be turned on and off only in the SSB mode. In FSK, the processor is automatically switched into the circuit. When the speech processor is on, the SSB signal obtained from the output of Q26 is amplified by Q33 (2SC2712), and the components above a specific level are clipped. The resulting signal is amplified by Q30 (3SK131). The output level of the speech processor is varied by changing the second gate voltage of Q30. The output level is controlled by the PROC OUT control on switch unit (A1H10). The processor output from Q30 passes through ceramic filter CF5, and is output when processor Q26 is turned off by D60, D61, and D62 (RLS73x3). The signal then exits the signal unit.

The signal supplied from the signal unit enters the IF unit and is mixed with the third local oscillator signal of 9.265 MHz by Q41 (3SK131) to obtain an 8.83-MHz IF signal. This signal passes through ceramic filter CF1 with the NULL point set at 9.265 MHz, amplifier Q40 (2SC2712) for matching the signal to the next ceramic filter XF3 (YK-88S), and the 8.83-MHz IF filter. The SSB, FM, FSK signals pass through XF3 (YK-88S), and the CW and AM signals pass through the filter unit (C13). The output from the filter is amplified by Q38 (3SK131). ALC is applied to Q38.

The output from Q38 is mixed with the second local oscillator signal of 64.22-MHz in Q36 and Q37 (3SK131x2) to generate a 73.05-MHz signal. This signal enters the RF unit from the IF unit.

In the RF unit, the signal passes through three LC bandpass filters, L93, L94, and L95, is mixed with the first local oscillator signal in Q20 and Q21 (3SK131x2), and is converted to the target transmit frequency. The output of Q20 and Q21 passes through a bandpass filter, which is split to three frequency ranges: 1.5 MHz, 7.5 to 14.5 MHz, 14.5 to 30 MHz; the 7.5-MHz section covers all frequency below 7.5 MHz, amplified by Q22 (3SK131) and Q19 (2SC2954), and routed from the DRIVE OUT terminal on the rear panel. The signal enters the final unit via the DRIVE IN terminal through the jumper cable at the rear.

The signal is amplified by Q1 (2SC1971), Q2 and Q3 (2SC333x2), Q4 (1/2, 2/2) (MRF429MP). Harmonics are eliminated from the signal by the filter unit, and the signal is emitted from the antenna.

FSK is based upon AFSK methods with the mark (1225 Hz) or space (2295 Hz) being generated by the carrier unit or the AFSK signal is input to signal unit IC9 and modulated by D41. In the FSK mode, the speech processor circuit works, providing 10- to 20-dB of compression, and also suppresses the difference in the levels between the mark and space signals.

The FM signal passes through buffer amplifier Q20 (2SC2712) and the FM MIC AMP module in the A unit, and is used to modulate the second local oscillator.

• ALC circuit

The level of the forward wave voltage (VSF) detected in the filter unit may be adjusted by VR12 (VSF) on the control unit and is applied to the differential amplifier composed of Q10 and Q11 (2SC2712x2).

When VSF is applied to the base of Q10, the emitter voltages of Q10 and Q11 increase and the current through the base of Q11 decrease which causes the collector voltage of Q11 to rise. When this voltage exceeds the emitter voltage of Q1 (2SC2712) about 1.8 V, stabilized by D1 (LT80C1P), the current begins to flow thru the base of Q1, dropping the on the collector. The ALC time constant RC circuit is connected to this collector. The change in the collector voltage is shifted by approximately 2.7 V by Q4 (2SK2081) and D5 (RLZJ473), and matched with the voltage for keying by Q5 (2SC2712) and D6 (RLS73) to generate the ALC voltage. This ALC voltage activates the ALC by powering the second gate voltage of Q38 (3SK131) of the IF unit.

• Power control circuit

Power is controlled (reduced) by powering the base voltage of Q1. As the base voltage of Q11 is decreased, the emitter voltages of Q10 and Q11 are decreased. This allows Q10 to be turned on even if the base voltage (VSF) of Q11 is low. That is, ALC works to lower the power even if the power is already relatively low.

When the power output is maximum, Q16 (DTC124EK) is on, Q12 and Q14 (DTC124EKx2) are off, and VR2 (PWR VR) of the switch unit (A1H10) is shorted. Therefore, the base voltage of Q11 has the value determined by voltage dividers R65, R67, and front panel PWR VR. When the PWR VR is turned to MIN, the base voltage of Q11 is lowered, and ALC begins with low power. When the PWR VR is set to MIN, VR10 (IMK) and the PWR VR of the control unit are parallel, and the MIN power setting can be controlled by VR10.

For AT tuning, the power is lowered to about 10 W. The AT start signal (A⁺St) turns on Q14, and the base of Q11 is connected to ground via R72 to lower the

Q15 (DTC124EK) is used to turn off the PWR VR control to prevent the PWR VR from influencing tuning.

CIRCUIT DESCRIPTION

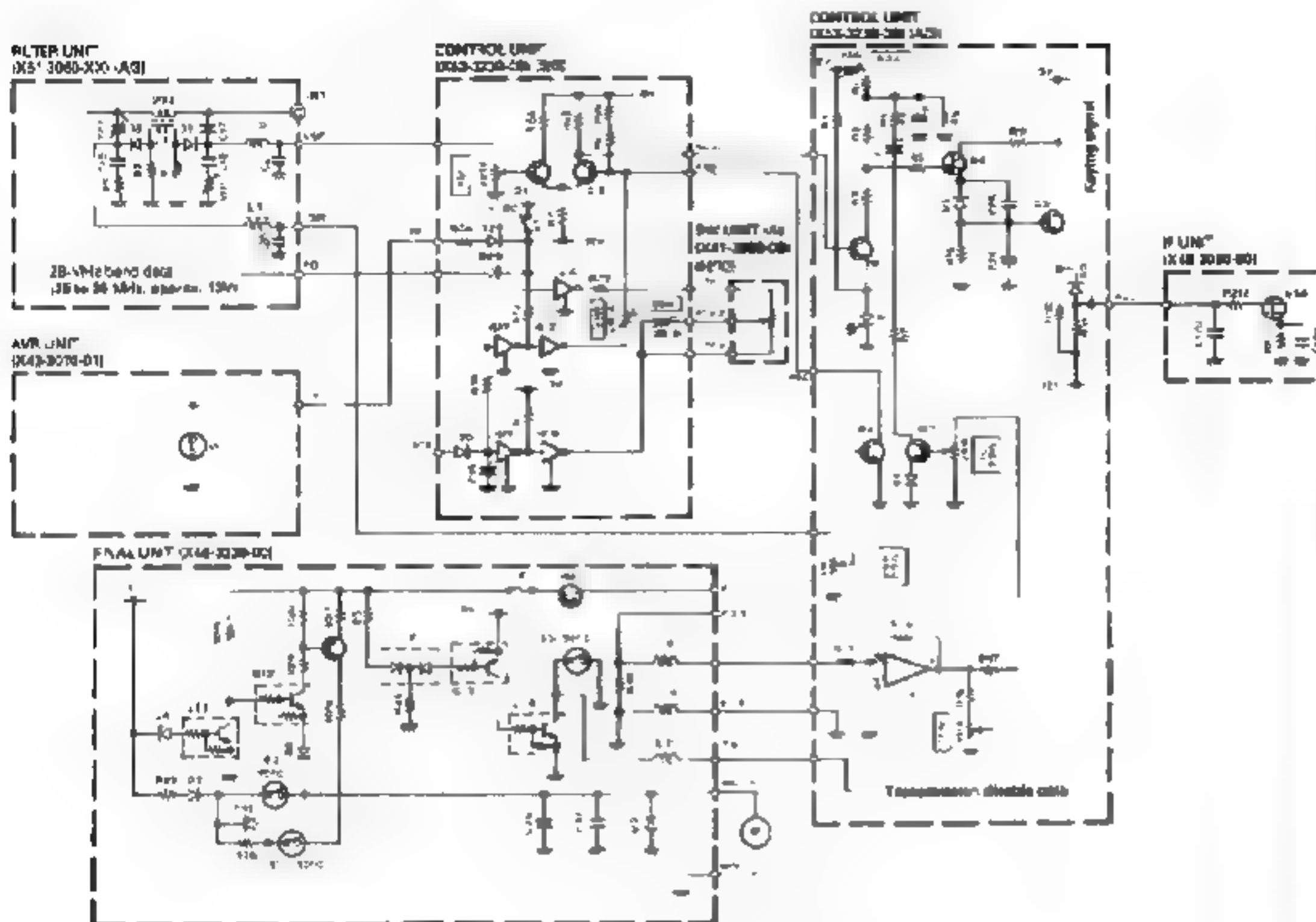


Fig. 8 ALC, power control and protection circuit

If the power output control is used only when ALC action begins, its range increases as the power output is lowered. Therefore, the switch unit (AU 1-7/10) PWR VR has two functions; one controls ALC, and the other changes the second gate voltage (PCV) of Q22 (3SK131) on the RF unit. By changing the gate voltage, the difference between the maximum and minimum gains is approximately +0 dB to prevent excessive ALC action when the power output is low.

The gain is also reduced during AT tuning. When the AT signal arrives at the RF unit, PCV is grounded at Q25 (DTC124EK) to eliminate the influence of PWR VR, and the second gate voltage is made constant (nearly the same value as when the PWR VR is MIN).

Protection circuit

RF limit protection

When the reflected wave voltage (VSA) from the filter unit is raised by load variation or AT tuning, Q2 (2SC2712) of the control unit turns on, and the voltage on the ALC time constant circuit is decreased. The power output is lowered by decreasing the drive to protect the final transistor.

CIRCUIT DESCRIPTION

2) IC protection

The final transistor collector current is detected via the voltage drop across R3B of the final unit. Since the detected voltage is negative, it is inverted and amplified by IC8 (NJM4558M) on the control unit. IC8 turns on Q3 (2SC2712), reduces the voltage on the A.C. time constant circuit, and decreases the drive to limit the final transistor current.

When the fuse on the line unit blows, the 50-V AVR is turned off. TX1 is grounded by D7 (MC921), Q15 (DTC124ES) and Q14 (DTC124ES), and disabling transmission.

• Temperature protection

If the final heat sink temperature rises to approximately 50°C, the temperature switch S11 of the final unit turns on. Current then flows to the fan motor through R23 and D5 (1S1555), and R36 and D10 (UPZ4.73), and the fan motor starts running at a low speed. D10 is a zener diode that produces the current necessary for starting the motor.

If the final heat sink temperature rises to approximately 70°C, temperature switch S2 turns on, and D10 and R36 are shorted. The voltage applied to the motor then increases and the fan motor runs at higher speed. If the sink temperature reaches 90°C through some failure, S3 turns on, TX1 is grounded, and transmission is disabled.

If the power transformer temperature rises to approximately 80°C, temperature detection switch S1 of the AVR unit turns on and the power is lowered to protect the transformer.

• Safety discharge cooling circuit

70 to 80 V is applied to the electrolytic capacitor of the power supply whenever the power switch is turned on. This capacitor will not discharge immediately when the power switch is turned off. Since the voltage on the 15-V power supply soon falls when the power supply is turned off, the voltage remaining on this capacitor will be consumed by the fan motor.

The fall in voltage on the 15-V power supply line is detected by D4 (MTZ4.7JC) on the final unit. If the voltage drops to approximately 10 V, Q11 (DTC124ES) turns off, the collector voltage rises, and Q12 (DTC143TS) turns on. When Q12 turns on, Q13 turns on allowing the voltage to discharge slowly through R27, Q13, R28, D6 keeping the fan on.

• Monitor circuit

1) Monitor circuit (AM)

The monitor circuit uses the sub receiver to receive and monitor the signals after conversion to the transmission frequency unlike conventional monitor circuits that monitor the IF signals. The monitor circuit produces the same audio signal that is transmitted and monitored by another receiver. In the AM mode, the signal passes through the SS8 filter for product detector.

The signal taken from the bandpass filter output before Q33 of the RF unit is applied to the first mixer (Q8 to Q11) of the sub receiver via D49. Since the level might be too high, it is attenuated by Q37 when the signal is determined to be too large, and is further attenuated by Q4 in the IF unit. The amount of attenuation in the IF unit can be adjusted by VR1, and the degree of AGC can also be changed.

The sub receiver output SAF passes through IC6 (a/4) and IC10 (a/4) of the AF unit, and is applied to IC8 (a/2) via the monitor control. It is amplified and routed in the same manner as an signal. To cut off noise entering IC8 when transmissions are not monitored, analog switch IC6 (b/4) is shorted to ground until the monitor circuit is again turned on.

2) Monitor circuit (FM)

The signal output is a 21, having passed through the clipper and deemphasis circuit in the FM microphone amplifier circuit (X59-3000-03), is applied to the deemphasis circuit. The resulting signal passes through IC10 (c/4), applied to the IC10 (d/4) input (pin 10), and is amplified and routed as for the other modes.

CIRCUIT DESCRIPTION

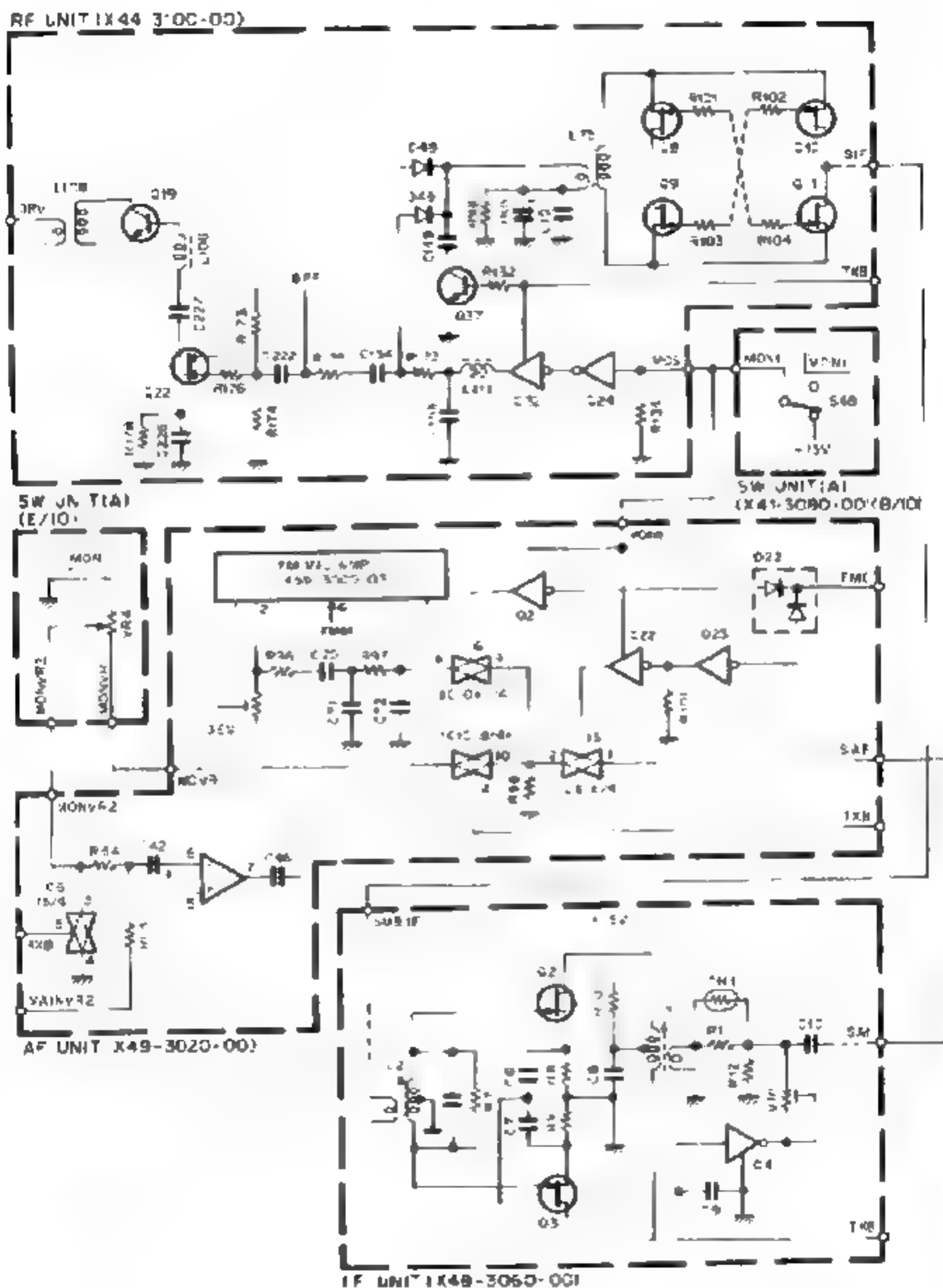


Fig. 9 Monitor circuit

CIRCUIT DESCRIPTION

• Side tone generation circuit

The AFT signal (80 kHz when the PITCH control is at the center; the frequency is changed within ± 50 kHz by turning the control; 150 kHz in the SSB mode) generated by the CAR unit is rectified by Q1. The square wave of 800 ± 500 Hz divided to 1/100 by IC1 is applied to switched capacitor filter IC3 to obtain a sine wave interlocked with the CW receive pitch.

The 40 ± 25 kHz obtained by dividing the AFT signal in half with IC1 is sent to the clock that determines

the center frequency of IC3.

Keying the transceiver switches Q7 via the KEY line from the control unit (high when the key is down). This forward biases muting transistor Q6 to produce the intermittent sine waves.

When the monitor is on, Q6 is biased through R27 and side tone is turned off.

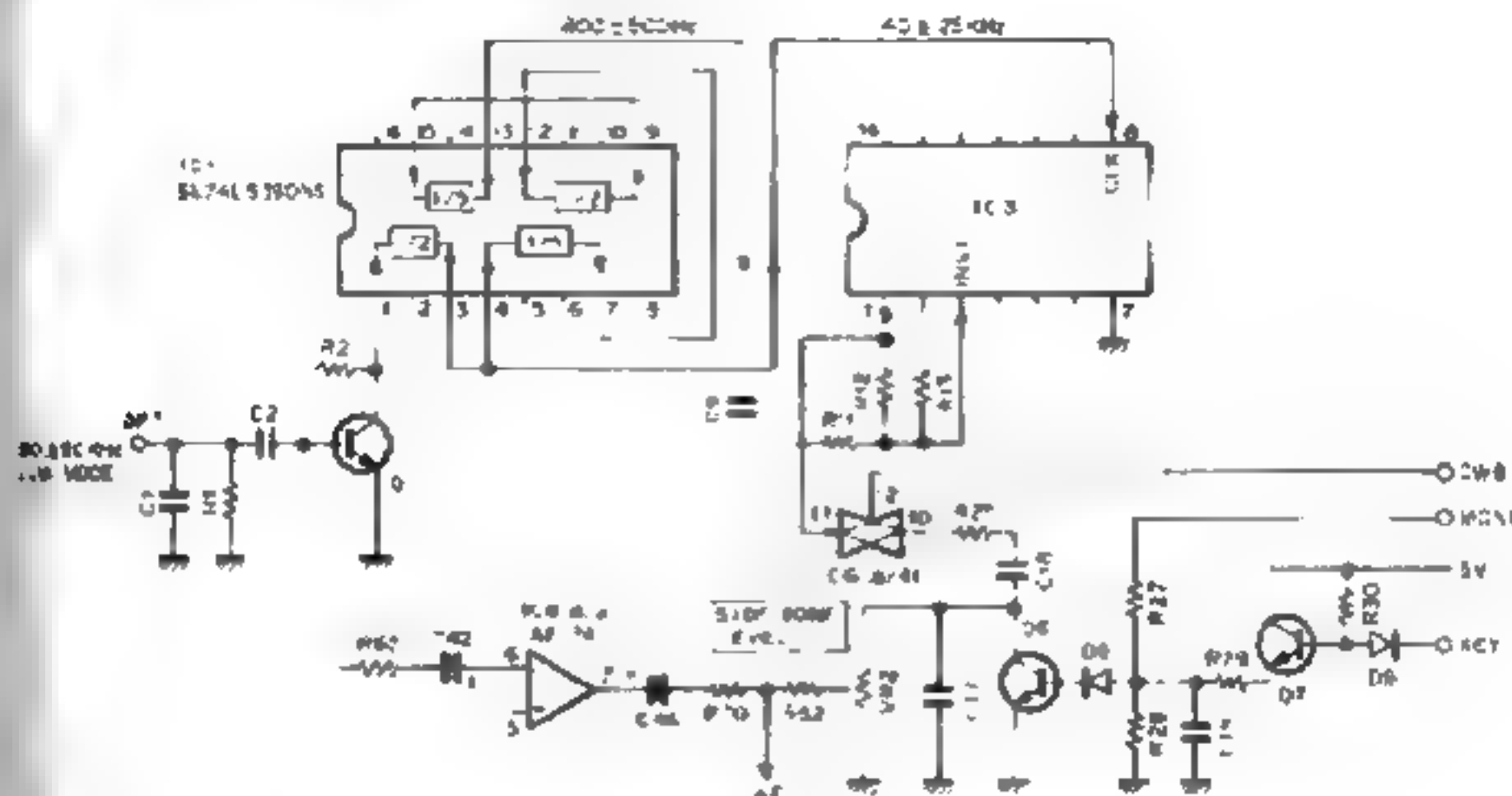


Fig. 10 Side tone circuit

• AF VBT circuit (AF unit)

Filter IC2 (MF10CCWM) is inserted into the AF amplifier circuit in order to eliminate radio interference. This circuit functions only in the CW mode when the AF TUNE switch is on.

The center frequency of the filter is changed when the pitch of the receiver side tone is varied with the PITCH control. The Q of the filter circuit can be changed in conjunction with the AF VBT control.

When SSB or FSKC goes low in a mode other than FM or AM, Q3 turns on via D3, and C5 (a/4) and (b/4) turn on. When CW3 goes high in the CW mode, IC5 (a/4) and (b/4) turn on via R20 and D1. (Preventing the signal from passing through filter IC2.)

If the AF TUNE button is pressed, AFTSW goes high, Q4 turns on, and IC5 (a/4) and (b/4) turn off. Since CW3 is low, Q5 turns on and IC5 (c/4) and (d/4) turn on. The output of the filter circuit selected by IC2 is controlled by analog switch IC5.

The center frequency (fc) of the filter is $f_c/50$ the

clock frequency. 40 ± 25 kHz is obtained by rectifying the AFT signal of 80 ± 50 kHz (in the CW mode with Q1) and dividing it in half with IC1. This signal is used as the clock in the same way as with the side tone generation circuit, and fc is 800 ± 500 Hz and is changed via the PITCH control.

The passband width can be varied with the AF VBT control, that is connected between pins 17 and 18 of the main receiver. The passband width can be varied with potentiometer VR1 (10 kΩ) in the sub receiver. It can be adjusted to within ± 100 Hz.

Filter IC (MF10CCWM), IC2, used here contains two blocks consisting of an active filter (IC3 [MF50WM], used in the side tone circuit). Various additional filter configurations can be formed by using external resistors. The center frequency depends on the clock frequency. The filter characteristics and clock frequency can be adjusted and set at will according to the ratio of the external resistor values.

CIRCUIT DESCRIPTION

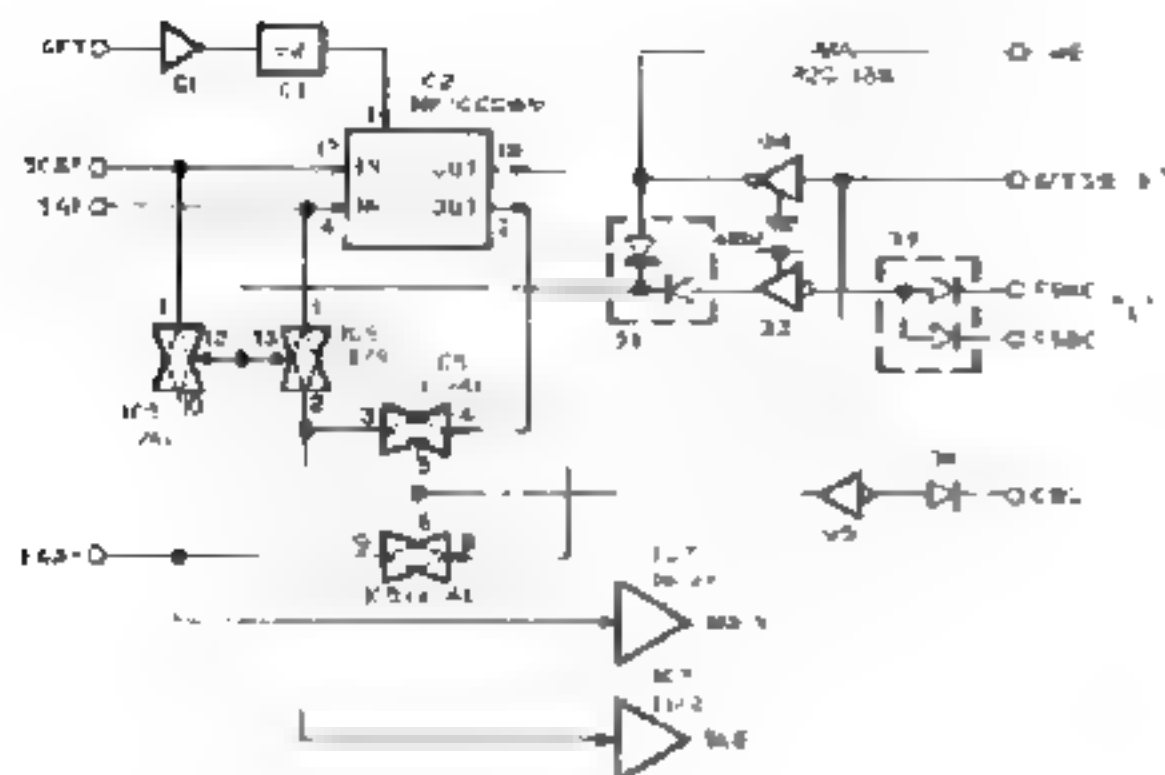
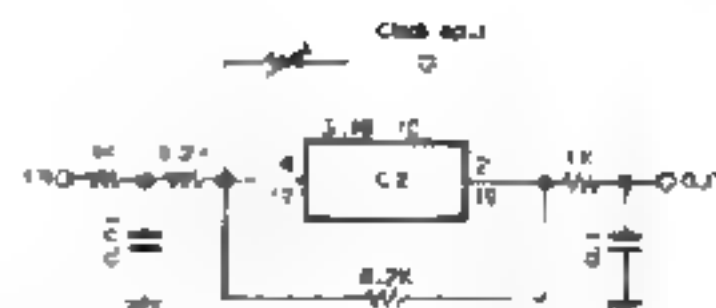


Fig. 11 AF VET circuit



Terning: function of IC2

- | | |
|--------|---|
| 2, 19 | : Bandpass filter output |
| 3, 16 | : Connection of resistor for changing Q |
| 4, 17 | : Input |
| 5, 15 | : Analog ground (-5 V) |
| 7, 8 | : Power supply (+10 V) |
| 10, 11 | : Clock input |

Fig. 12 Basic configuration of IC2 (MF10CCWM)

- Auto antenna tuner

When the AUTO/T-RU switch is set to AUTO, ATA goes low, the AUTO/T-RU switching relay K¹ closes, and the AT is inserted to prepare for tuning.

When the AT TUNE is turned on, ATS goes high and Q10 turns on. If the VSWR is greater than 1.2, Q7 also turns on. A pulse with the appropriate duty cycle for the VSWR is obtained from the pulse control circuit consisting of IC8 and IC7 (a/21) and is used to drive Q5 and turn Q4 on and off. This produces the motor control signal that controls the motor drive ICs (IC4 and

IC5d. The output from the collector of Q7 is directed to the digital unit as an "OK" signal (low when tuning is completed) indicating the completion of AT tuning. ATS is also fed to the RF unit. The transmitter output during tuning is limited to approximately 10 W.

The VSWR is calculated from the forward wave and reflected wave voltages V_{SF} and V_{SR} , and detected by filter and L1 via the microprocessor in the digital unit. The VSWR is converted to an analog voltage in the range of 0 to 5 V according to the results of this calculation, and is then applied to the VSWR line.

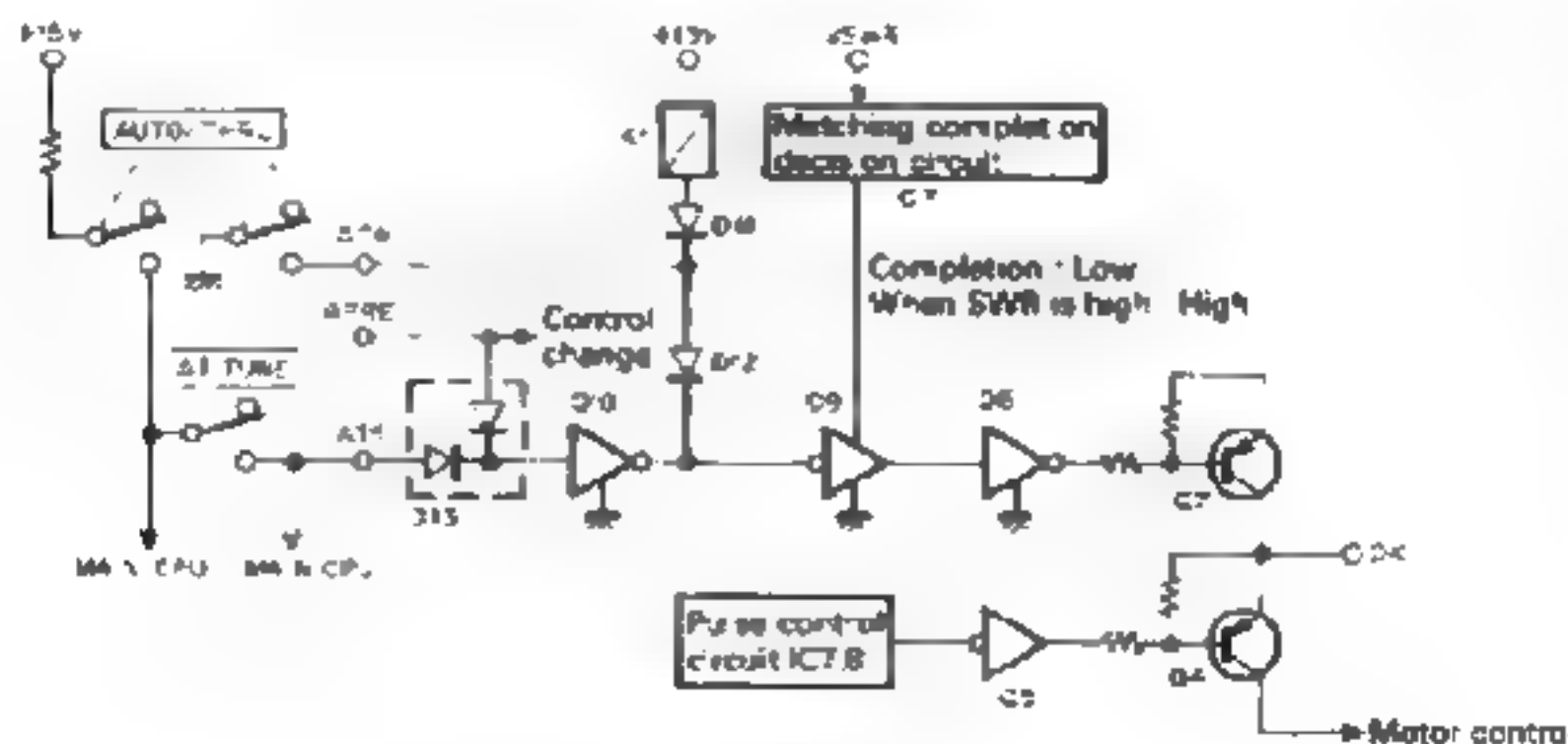


Fig. 13 Auto antenna tuner circuit

CIRCUIT DESCRIPTION

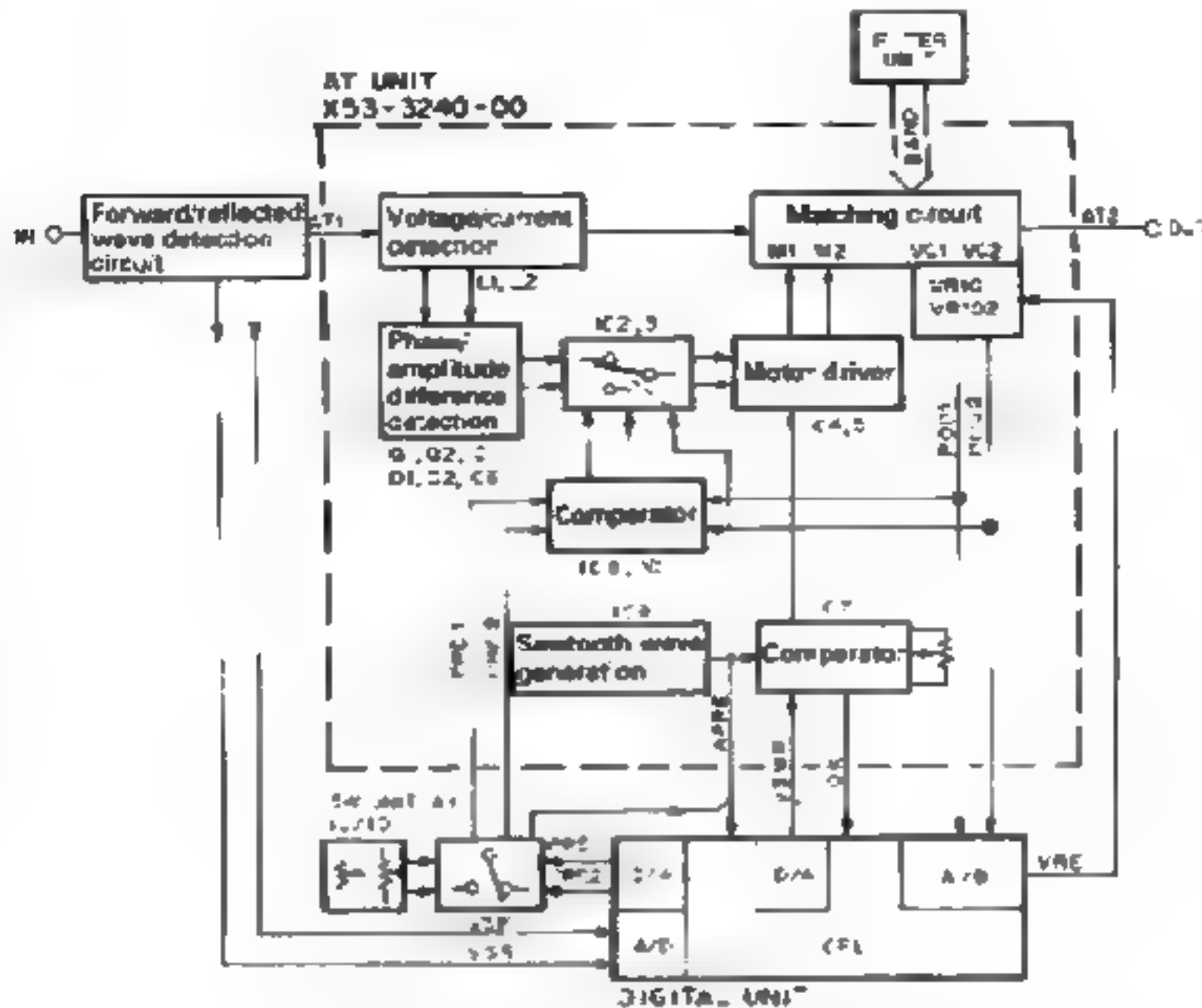


Fig. 14 Auto antenna tuner block diagram

1) Auto tuning mode

The transmitter power from the final unit via the filter unit, passes through the current/voltage detection transformers L1 and L2, which make use of a toroidal core. The current and voltage components detected here are rectified by a waveform rectifier circuit consisting of D4, Q1, and D7, and Q2, and are then phase-compared by IC1 (SN74S74N). The output signals from pins 8 and 9 of IC1 (Q and Q) pass through the switch by IC2 (TC4066BP), and are applied to motor drive IC (IC4). Variable capacitor VC1 is turned by motor M1 so that the phase difference of the voltage and current components decreases.

The voltage and current components detected by L1 and L2 are rectified by germanium diodes (1N60: D1 and D2, and are applied to the voltage comparison circuit IC6 (NJM2903S) as the amplitude component of the signal. The comparator output passes through the switch by IC3 (TC4066BP). Motor M2 is driven by another motor drive IC, IC5 (BA61C9L2), which is used to turn variable capacitor VC2 in the direction that decreases the amplitude difference of the voltage and current components.

Therefore, variable capacitor VC1 adjusts the capacitance of the circuit so that the current and voltage

phases match. Variable capacitor VC2 adjusts the resonance of the circuit so that the current and voltage amplitude difference decreases.

The voltage standing wave ratio (VSWR) is calculated by the digital unit from the forward wave and reflected wave that is detected by the filter unit. The VSWR signal, which is 0 to 5 V according to the calculated results, is applied to SWR comparison circuit IC7 (1/2). Voltage corresponding to an SWR of 1.2 is applied to the reference voltage pin (pin 7) of this comparison circuit via the potentiometer. When the actual SWR value is 1.2 or higher, the output pin (pin 8) of SWR comparison circuit IC7 (1/2) goes high, Q8 turns on, and motor drive voltage control transistor Q7 turns on. Emitter Q4 has approximately 15 V. This voltage is output to the digital unit as a signal indicating tuning high which lights the AT TUNE LED.

The sawtooth wave generated by IC8 (NE555C) is applied to the inverted input pin of IC7 (1/2). The VSWR signal that was described previously is applied to the non-inverted input. Therefore, as the SWR decreases, the output of IC7 (1/2) changes from a continuous waveform to a continuously changing pulse with a relatively small duty cycle. This waveform drives Q5 and Q4 as the motor drive voltage.

CIRCUIT DESCRIPTION

Through the use of these circuits, when the SWR is 3:1 or more, the motor runs at high speed since the duty cycle of the motor drive voltage pulse is 100%. When the SWR is approximately 2:1, the duty cycle becomes approximately 50%, and the motor runs at low speed.

The matching circuit used in the tuner is a T-type. The tap position from 1.8 to 30 MHz is controlled by eight relays, K101 to K108.

Position detection potentiometers VR101 and VR102 are linked to the rotation axes of variable capacitors VC1 and VC2 with a gear ratio of 1:1. Voltages of 0 to 5 V (POD1 and POD2) are generated according to the position of the variable capacitors. This position data is applied to variable capacitor angle control comparators IC9 and IC10, and is used as the reference voltage in the feedback control system which is used for preset tuning and manual tuning. The same signal is also directed to the A/D converter of the digital unit, and used for preset data and to signal the completion of tuning.

The potentiometer used here is not an control that rotates 360 degrees. Since the rotation angle of this potentiometer is limited, the rotation range is from the minimum capacity to the maximum capacity plus a little extra for headroom.

Through this control, like preset tuning, which will be described later, POD1 and POD2 are monitored by the microprocessor. If the lower limit voltage of 0.6 V or the upper limit voltage of 4.2 V is reached, the microprocessor detects that the voltage is close to one of its limits. To return the voltage to the opposite side, the APRE line is switched high. For VC1, if the voltage is close to the lower limit with respect to PRE1, the voltage near the upper limit is output. If the voltage is close to the upper limit with respect to PRE1, the voltage near the lower limit is output. The other variable capacitor VC2 outputs the voltage read by POD2 to PRE2 as it is.

If the variable capacitor voltage exceeds the specified limit, it is returned to the opposite limit. The other variable capacitor remains in the same position.

2) Manual tuning

When AUTO/MANUAL select switch S62 of the switch unit (AU101) is set to MANU, the signal applied to PRE1 and PRE2 is switched to the manual tuning potentiometers VR8 and VR9 via analog switching IC1. Simultaneously a high signal is applied to the APRE line, causing Q3 of the AT unit to turn on, and the control switches of IC2 and IC3 are switched to PRE1 and PRE2. Potentiometers VR8 and VR9 generate approximately 0.4 to 4.5 V, which is applied to another input of each variable capacitor angle control comparator, IC9 and IC10, and is compared with the position data. Feedback control is performed so that the voltages match.

3) Preset tuning

When auto or manual tuning ends (the OK signal changes from high to low), and the voltage of POD1 and POD2 is placed in memory as preset data for that band by the microprocessor. When the band is changed, even if tuning is performed in another band, VSWR and APRE go high, and preset tuning is performed by the feedback control system. If the microprocessor detects that PRE1 and PRE2 match POD1 and POD2, the VSWR returns to its original value (the best SWR value calculated), and APRE goes low. The auto control system becomes effective. (The initial preset data when the microprocessor is reset includes standard data for a 50Ω load on each band.)

CIRCUIT DESCRIPTION

• Standby control and timing

Standby control and timing are performed by the control unit (X53-3230-00). The input control signals include the following:

- SS : Standby switch Active low
- SS : Inverted SS Base for producing each timing voltage
- CSS : Standby signal to the microprocessor Active low
- ATS : Standby signal from ANT TUNER Active high
- ESS : Standby signal from the personal computer control Active high
- KEY : Keying signal from the keyer Active low
- KSW : Signal indicating whether a key is inserted in the key jack. GND: Key is inserted
- TXI : Transmission disable signal from the microprocessor. Low (disabled)
- VOXQ : Standby signal from VOX. Active high

The output control signals include the following:

- CTX3 : Signal that generates TXB transmitter 15 V. Active high
- TXB : Transmission 15 V
- CV3 : Keying signal generated by keying. Active high
- CKY : Keying signal with timing. Active high
- RXB : 15 V in receive mode. Same timing as inverted TX3.
- RBC : Receive control signal with timing. Active low

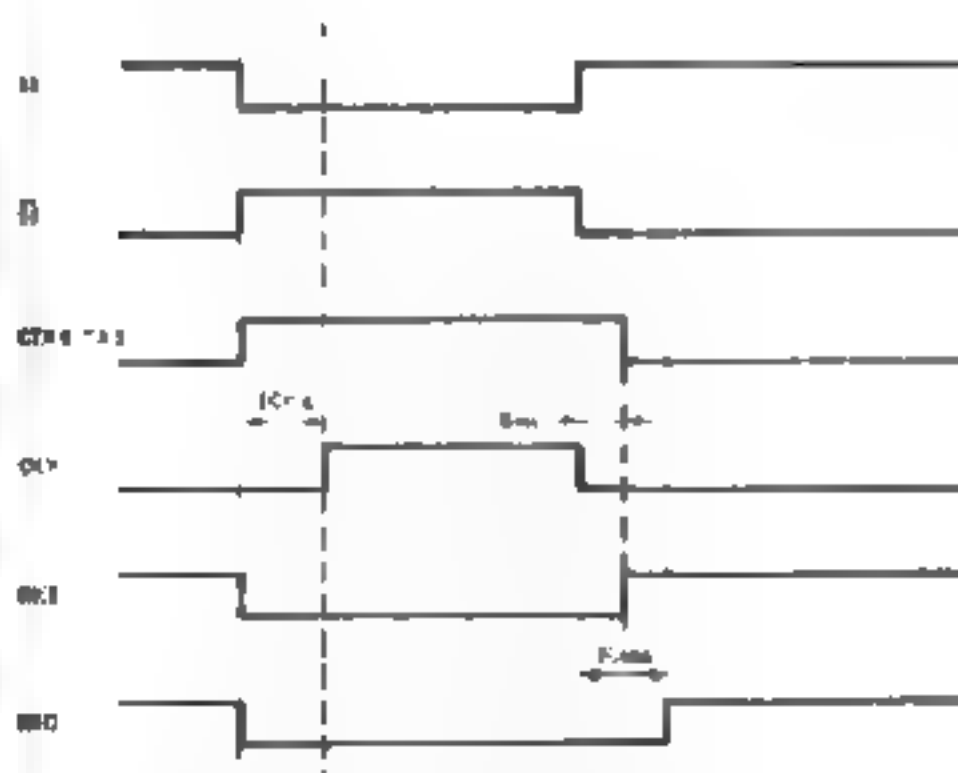


Fig. 15 Basic timing chart for standby

1) Manual standby (other than CW)

• RX to TX switching

Occurs when the standby switch is pressed and the SS line is grounded. If pin 5 (TXI) of the CVT module (X59-3660-00) is high (transmit is possible), Q203 and Q202 in the module turn on and 15 V is applied to pin 2 from the collector of Q202. Voltage SS passes through pin 5 of IC13 and D16 and is applied to pin 2 of the TRX module (X59-3680-00) as CTXB. This signal turns on Q153 and Q152 and generates TXB from pin 5. The collector of Q152 goes high, Q154 turns on, Q155 and Q156 turn off, and RXB from collector of Q151 turns off.

• CKY generation

SS forces pin 2 of IC6 high, and triggers pin 4, the A output, of IC10 one-shot multivibrator. The Q output is low for 10 ms and then goes high. As a result of this pin 3 of IC6 goes low 10 ms after the standby switch is pressed. The signal is then applied to pin 11 of IC5, and the inverter output is fed on pin 10.

The CVB line applied to pin 13 of IC5 is high in the CV mode and is low in other modes. This causes the inverter output on pin 2 to always be high.

Pin 6 of IC4 is high during full break-in, turning the analog switch on. Pin 13 of IC4 is high during semi-break-in, turning the analog switch on. CKY is output 10 ms after SS with the same timing from pins 2 and 3 of IC4 regardless of semi-break-in or full break-in status.

The CKY signal is generated, and a bias is applied to the second transmit mixer. Meanwhile, the signal is applied to pin 4 of the ALC module (X59-3700-00) via C17, passed through integration circuit Q251 for waveform shaping, and matched with the negative ALC signal to produce the FET gate bias for the transmitter.

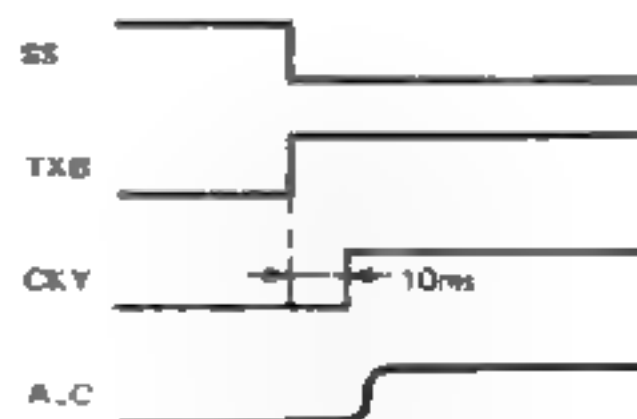


Fig. 16 CKY generation

CIRCUIT DESCRIPTION

TX to RX switching

When the standby switch is turned off, Q253 and Q202 of the CWT module (X59-3660-00) are turned off, and the SS signal changes from high to low. Q16's anode changes from high to low 5 ms after the SS signal changes since there is a 5-ms time constant circuit composed of R43, R44, and C37 attached to the output of pin 2 of IC13.

Therefore, the cathode of D15 CTXB switches from transmit to receive, and TXB goes low 5 ms after the standby switch is turned off.

When TXB goes low, Q154 of the TRX module (X59-3680-00) turns off, Q155 and Q151 turn on, and RXB rises.

CKY down

When SS goes low, pin 2 of IC6 goes low, pin 3 goes high, pin 10 of IC5 goes low, and the CKY output goes low. Thus, the CKY signal changes from high to low when the standby switch is turned off.

The ALC waveform output from the ALC module rises according to the time constant of the integration circuit.



Fig. 17 CKY down

RBC generation

When CTXB line changes from high to low, pins 9 and 11 of IC13 go low, and the NAND gate output at pin 4 changes from high to low 5 ms after CTXB goes low, i.e., RXB rises according to the time constant circuit provided ahead of pin 8 of the inverter output.

The RBC signal is connected to the base of an NPN transistor. This transistor switches the 455-kHz receive IF circuit to ground. The receiver operates only when RBC is low.



Fig. 18 RBC generation

PLL data and transmit/receive timing signal

As explained earlier, the SS signal is used at the beginning of each operation. PLL data is switched, and mode switch and analog switch settings are changed to assure stable transmission and reception 10 ms after the SS line is grounded, until the last CKY timing signal for transmit has been generated, and for 5 ms after the RXB line rises, until the RBC line goes low.

2) Full break-in timing

Generation of the TXB signal at key down

When the key is inserted into the key jack, pin 9 of the CWT module (X59-3660-00) is grounded, and the emitter of Q208 is grounded.

When the key is down, Q201, Q208, Q206, and Q237 turn on, causing the output of pin 6, KYB, to go high. The KYB signal passes through D11, D23, pins 1 and 2 of IC3, and D22, and forces the SS line high. Q7 is turned on via D10, and the CSS line is grounded to notify the microprocessor of the start of transmission.

When the transmit disable signal TXI is low in order to disable transmit, Q205 and Q204 of the CWT module (X59-3660-00) are turned on, and the CWB line is grounded. Q206 and Q207 are turned off, and the KYB line goes low. The SS line remains low during this period.

When the SS line again becomes high, the CTXB line goes high via D16, therefore, Q153 and Q152 of the TRX module (X59-3680-00) are turned on in order to generate the TXB signal. Meanwhile, Q154, Q155, and Q151 are turned off, and the RXB line switches

CIRCUIT DESCRIPTION

CKY generation

When the SS line goes high, pin 2 of IC6 also goes high, and the \bar{Q} output of IC10 goes high after a 10 ms delay. The output of pin 3 of IC6 goes low 10 ms after that.

The output of pin 10 of IC5 goes high and pin 5 of the analog switch of IC4 goes high when in FULL break-in operation. Pins 4 and 3 conduct, CKY goes high, and the second transmit mixer of the IF line is keyed.

The CKY output enters the ALC module (X59-3700-00) via Q15, passes through the integration circuit Q251 for waveform shaping, and is matched with the negative signal of ALC to produce the \overline{FE} gate bias of the transmit IF.

Generation of RXB when the key is up

When the key is up, the SS line goes low, and the anode of D16 also goes low. Meanwhile, Q7 turns off and the CSS line goes high to notify the microprocessor of the start of reception.

Since there is a 5- μ s time constant circuit composed of R43, R44, and C37 for the output of pin 2 of IC13, the output of pin 4 of IC13 goes from high to low 5 ms after the SS line switches. Therefore, CTXB goes low 5 ms after the key goes up, and with a similar delay for the TX3 line.

When TXB falls, Q154 of the TRX module (X59-3520-00) is turned off, and Q155 and Q151 turn on, causing RXB to rise.

CKY down

When the key is up, KYB and SS go low, pin 3 of the NAND gate of IC6 goes high, and thus the CKY line goes low.

RBC generation

The RBC signal is generated in the same way as for manual standby. The RBC changes from high to low 5 ms after RXB rises when the key is released. The receiver operates only when RBC is low.

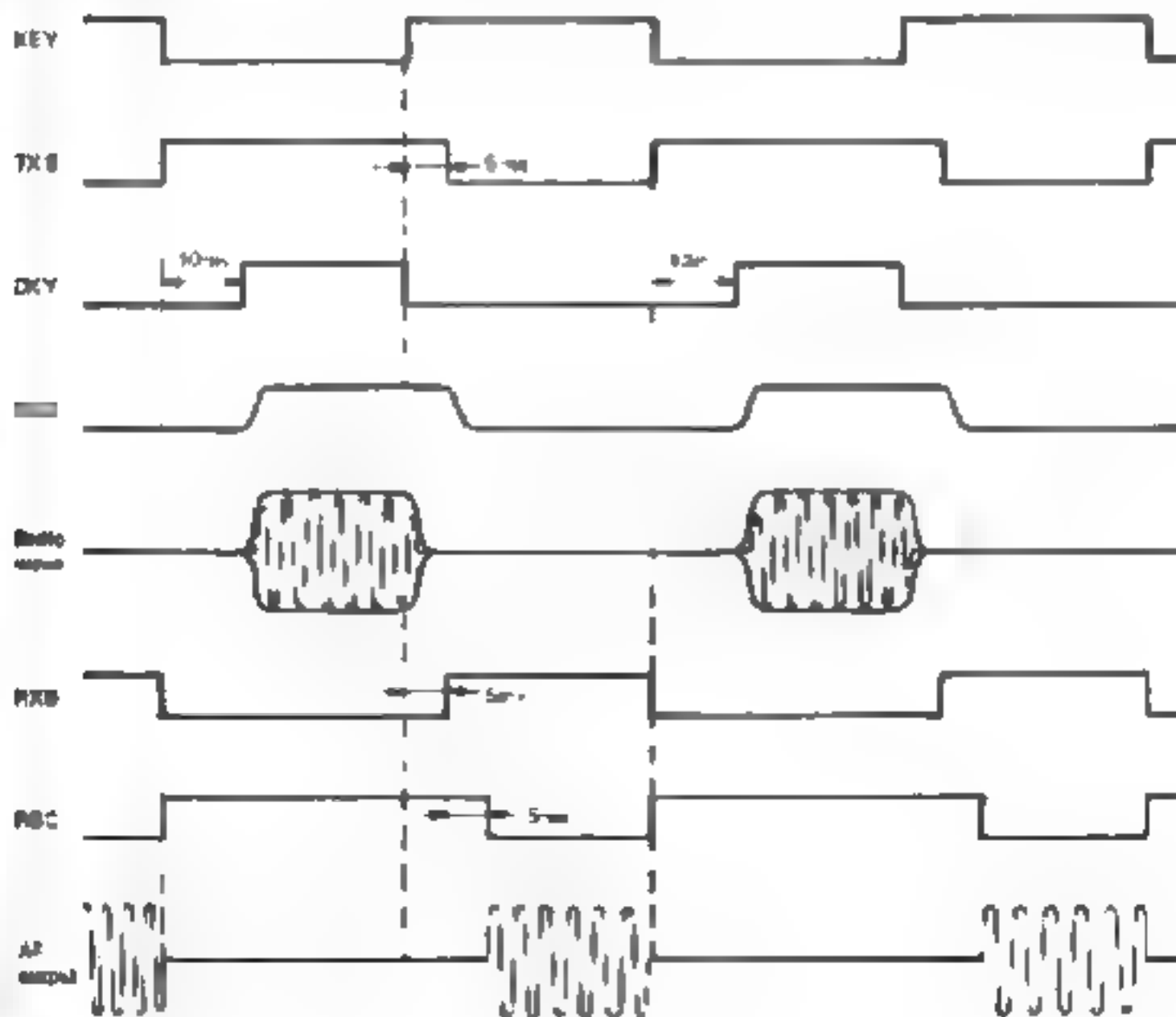


Fig. 19 Timing chart for full break-in

CIRCUIT DESCRIPTION

3) Timing for semi-break-in operation

• Generation of the TXB signal when the key is depressed

When the key is down, the \overline{SS} line goes high in similar to the manner described for full break-in.

During semi-break-in operation, pin 5 of analog switch IC3 goes high, and pins 4 and 3 conduct. Q7 is turned on via D26, pins 4 and 3 of IC3, and D10 from the \overline{SS} line; and CSS is grounded to notify the microprocessor of the start of transmission.

TXB is generated from CTXB via D16 from \overline{SS} .

• CKY and transmission hold circuit

The KYB signal produced by depressing the key triggers the A input pin of one-shot multi-vibrator IC10, and the Q output is high for a period of time.

Since pin 5 of analog switch IC3 is high, pins 4 and 3 conduct. Q7 is turned on via D10, pins 4 and 3 of IC3, and D10 from the Q output; and the CSS line is grounded. CSS is held low for the time determined by a time constant of the one-shot multi-vibrator, or the time constant for semi-break-in.

The KYB signal, having passed through D11, enters pin 11 of IC1, passes through the time constant circuit composed of R51, C38, and R52, and is applied to pin 1 of IC2's NAND gate from the IC1 inverter D21.

Pin 2 (\overline{SS}) of IC6 goes high through D27 and pins 4 and 3 of IC3 while the Q output of IC10 is high. The \overline{SS} line is held high while IC10 is retriggered by the keying signal.

Therefore, pin 2 of IC6's NAND gate is high. The A input of the IC10 one-shot multi goes high unless \overline{SS} changes 10 ms after \overline{SS} is triggered for the first time Q goes high. Pin 1 of IC6 goes high, and pin 10 of IC5 and pin 2 of IC2 go high.

Therefore, the output of pin 3 of IC2, the signal keyed by KYB is generated from pin 2 of analog switch IC4 with a 5 ms delay time and becomes the CKY signal. When the hold time of the IC10 one-shot multi-vibrator has elapsed after the key is released, the Q pin goes low, and \overline{SS} goes low, returning the unit to receive.

4) VOX operation

When one-shot multi-vibrator IC9 is triggered by the output of the VOX module (X59-1080-01) of the AF unit (X49-3020-00), the Q line output goes high and is connected to the control unit (X53-3230-00) by a harness. Q8 is turned on through pins 8 and 9 of analog switch IC3 from connector CN4 VOXQ pin of the control unit, and the \overline{SS} line is grounded. Subsequent operations are the same as for manual standby.

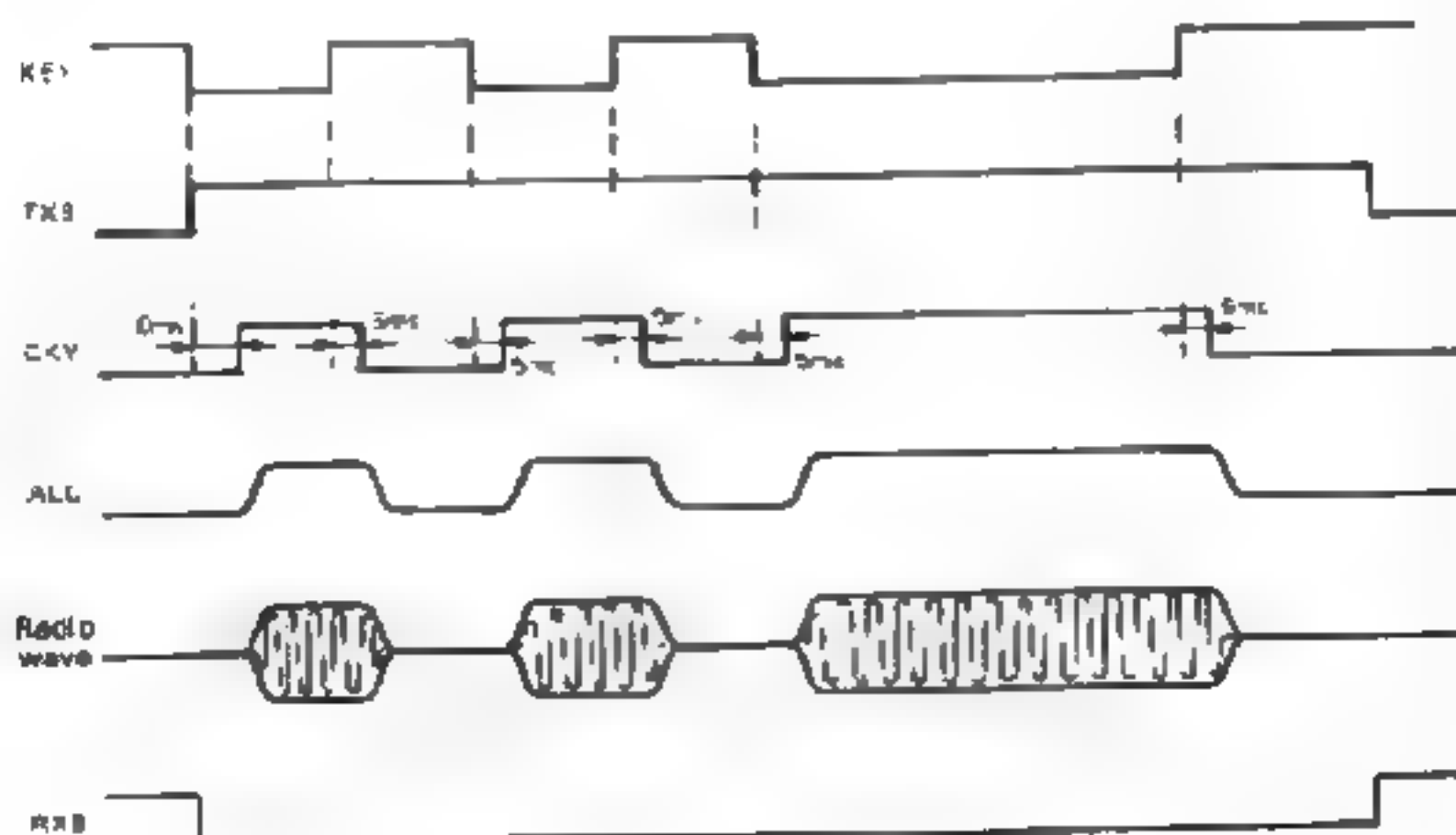


Fig. 20 Semi-break-in timing chart

CIRCUIT DESCRIPTION

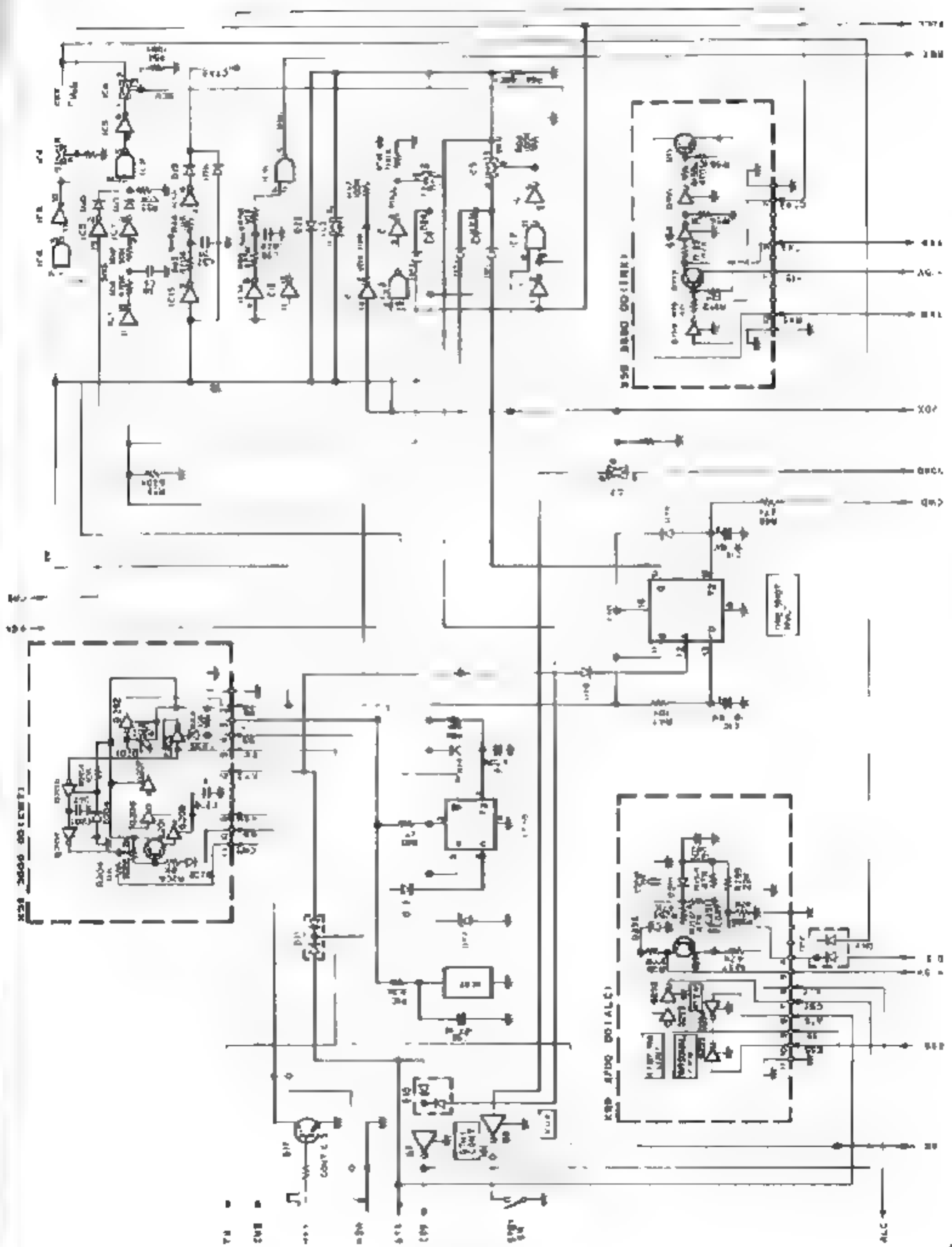


Fig. 21 Standby circuit

CIRCUIT DESCRIPTION

• Electronic keyer circuit

The TS-950 contains an electronic keyer circuit so that an electronic key, external electronic keyer or a squeeze paddle can be connected to the CW KEY jack on the rear panel. IC14 on the control unit (D53-3230-00) generates the CW Waveform, and is the major element of the electronic keyer circuit with variable speed and variable weight functions.

When the electronic key switch on the rear panel is off, the keyer circuit functions as a buffer and outputs the signal input from the dot pin to the standby circuit as it is. When the electronic key switch on the rear panel is on, the circuit outputs dot and dash codes according to the operation of the paddle connected to the CW KEY jack.

1) Variable weight function

Electronic keyer microprocessor IC14 has a variable weight function. For normal CW code, the dot/dash/space ratio is fixed at 1 : 3 : 1. This electronic keyer can vary the ratio of dot to dash.

When the auto switch is off, four ratios can be set according to manual weight data WT0 and WT1.

By default, Auto (OFF, WT0, WT1 = OFF, and Short point/Long point/Space is 1/3/1.

WT1	WT0	Short point/Long point/Space
OFF	OFF	1/3/1
OFF	ON	2/8/1
ON	OFF	1/3.2/1
ON	ON	1/3.4/1

Table 8

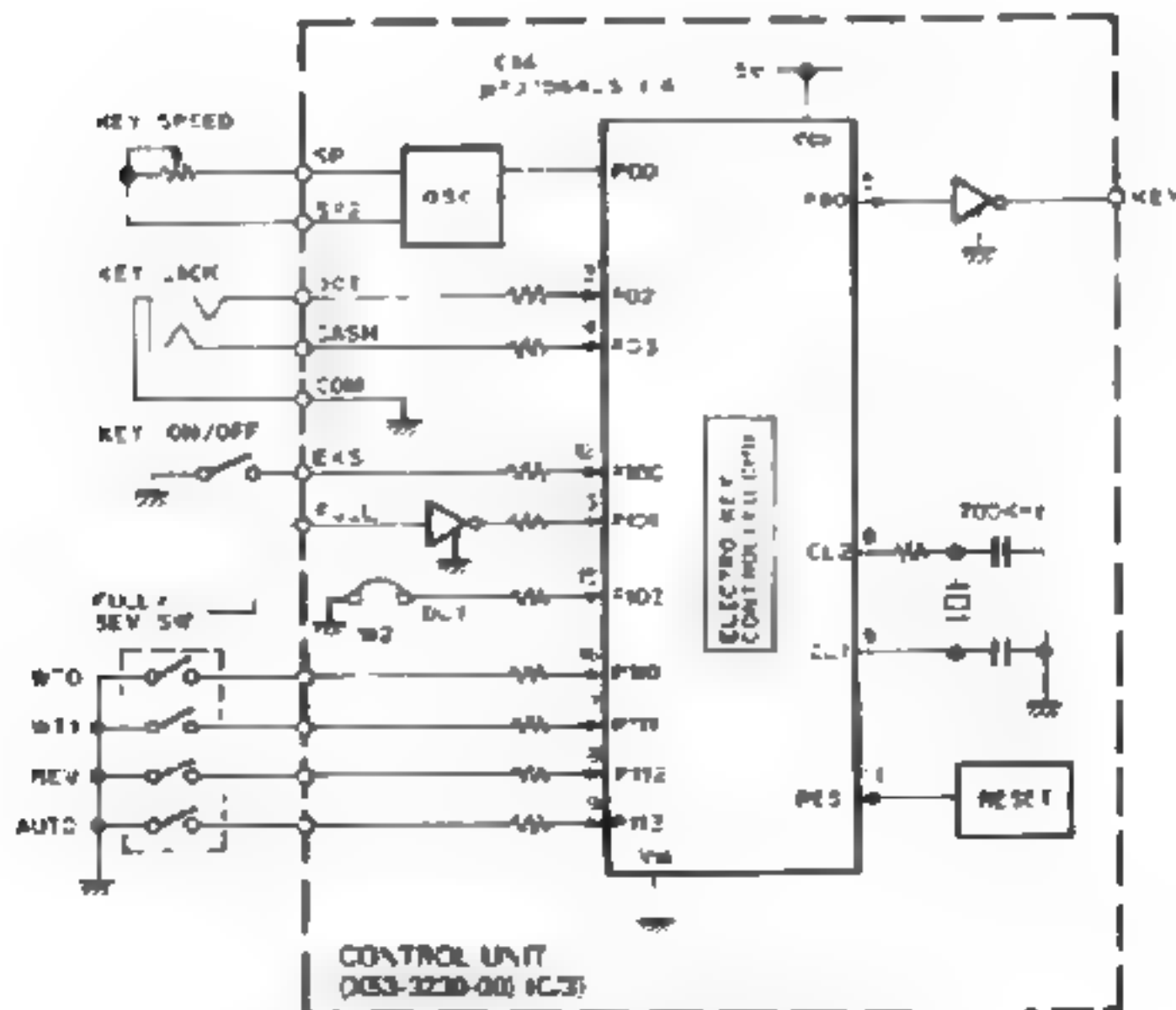
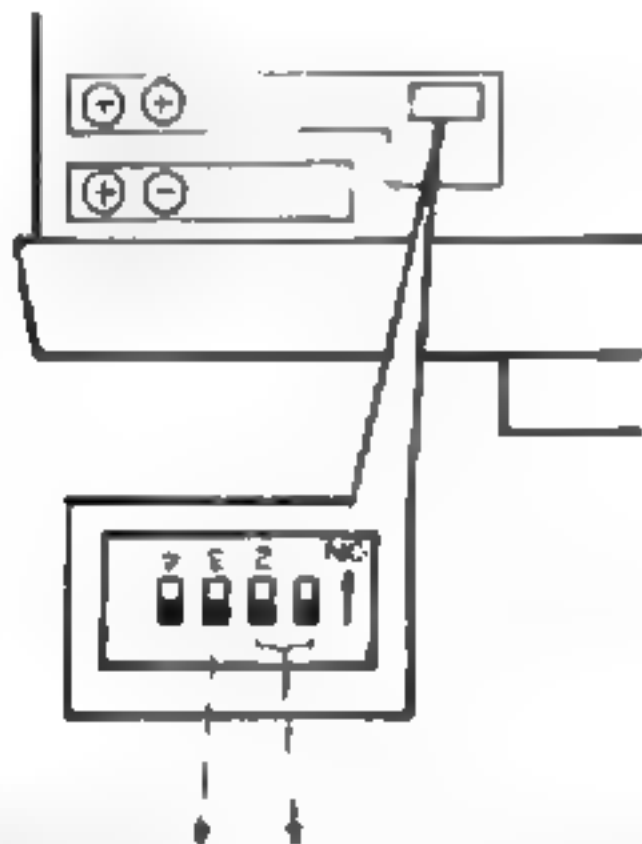
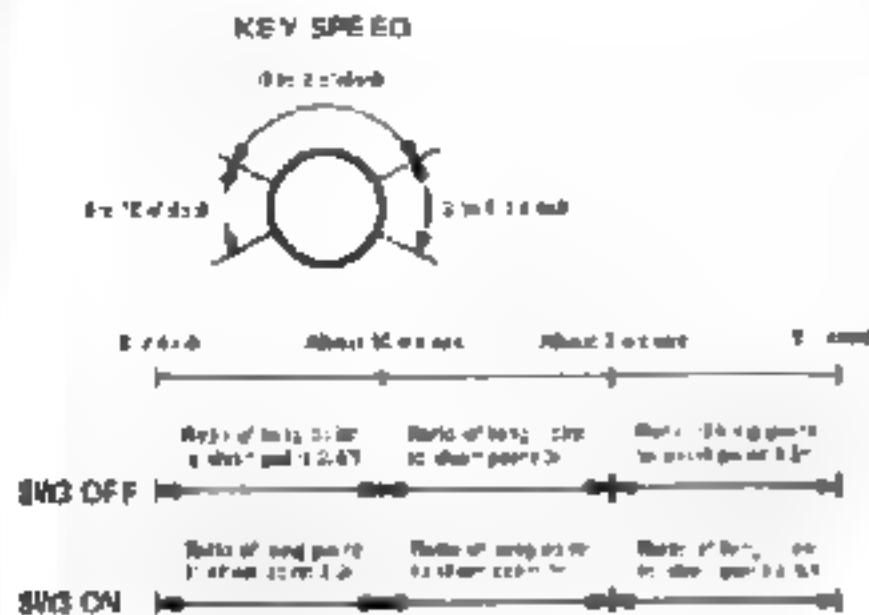


Fig. 22 Block diagram of electronic keyer

CIRCUIT DESCRIPTION

When the auto switch is turned on, the ratio of long point to short point is interlocked with the KEY SPEED VR and can be set automatically. As the keying speed increases, the speed is varied so that the long point is lengthened or shortened. This is selected by the REV switch.



SW4 ON		SW4 OFF		
SW3	Automatic setting of long point to short point	SW2	SW1	Fixed ratio of long point to short point
OFF	As the speed increases, the long point is lengthened	OFF	OFF	3 : 1
		OFF	ON	2 : 1
ON	As the speed increases, the long point is shortened	ON	OFF	3 : 2
		ON	ON	3 : 4

Fig. 23 Variable weight function by DIP switches

2) Full break-in correction function

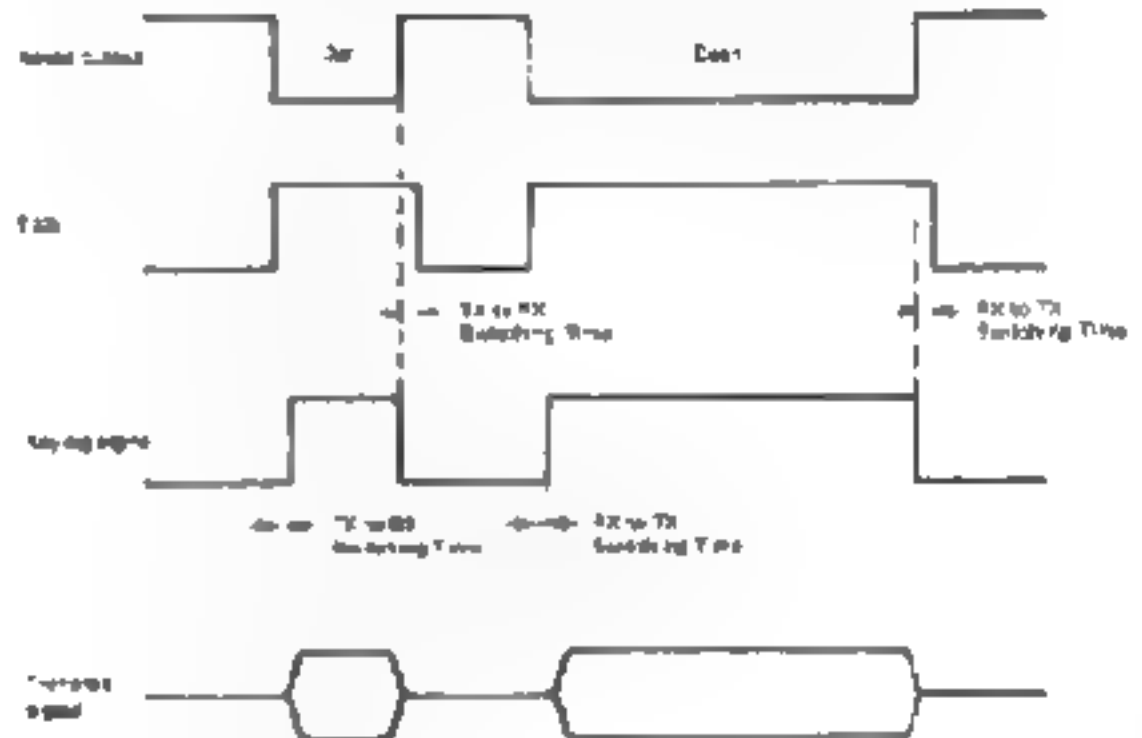
When full break-in operation is performed, the transmit time of the CW signal is shortened by the influence of the time constant of transmit/receive switching, even if keying is performed.

The electronic keyer has a full break-in correction function, which works automatically when the FULL/SEMI switch is set to FULL.

The full break-in correction function lengthens the CW waveform by 1/5 maintaining the dot time, shortens the space by 1/5 the dot time, and changes the duty cycle, while maintaining the lengths of the code and space constant. Thus the transmission signal is generated by taking the transmit/receive switching time into account.

The full break-in correction is effective for the weight-varied code as well.

Radio signal without full break-in correction



Radio signal with full break-in correction

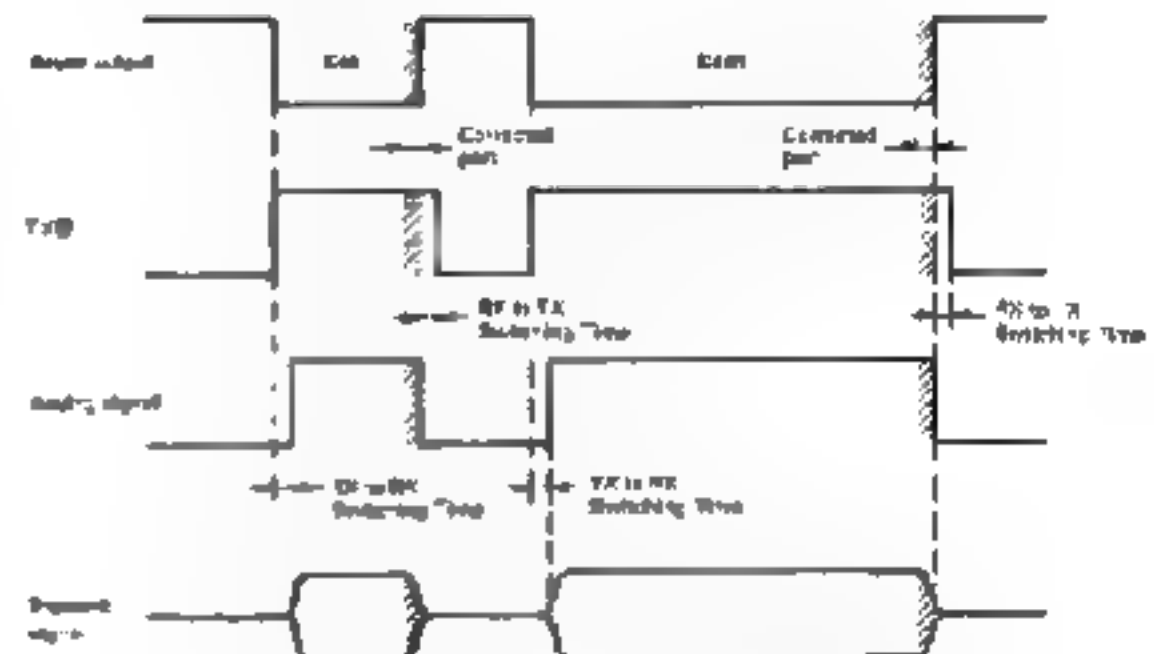


Fig. 24 Full break-in correction function timing chart

CIRCUIT DESCRIPTION

Digital control circuit

The TS-950 digital control circuit has a multiple chip configuration centered around IC1 (μ PD78C10G), and consists of a 32K ROM (MBV127C256A), an 8K RAM (TC5564APL), and an I/O port (MB893633, CXD10950). This circuit controls about 40 different inputs and about 70 different outputs.

A large fluorescent display tube and six CPU dedicated for the display are used so that the display can be controlled via serial data.

Encoder circuit

Ultra-small magnetic rotary encoders are used as the main and sub encoders. The Mich click encoders that were used in the TS-680 and have gained users favor are installed. The encoder pulse is applied to gate array LZ92K37, and read via the CPL bus. The gate array is selected by the Y3 or Y4 lines. Encoder data is output to D0 to D7 by selecting encoders CK1, CK2 or CK3, and CK4 by A8 (gate array AD), and making RD active. IC12 is used to rectify the waveform.

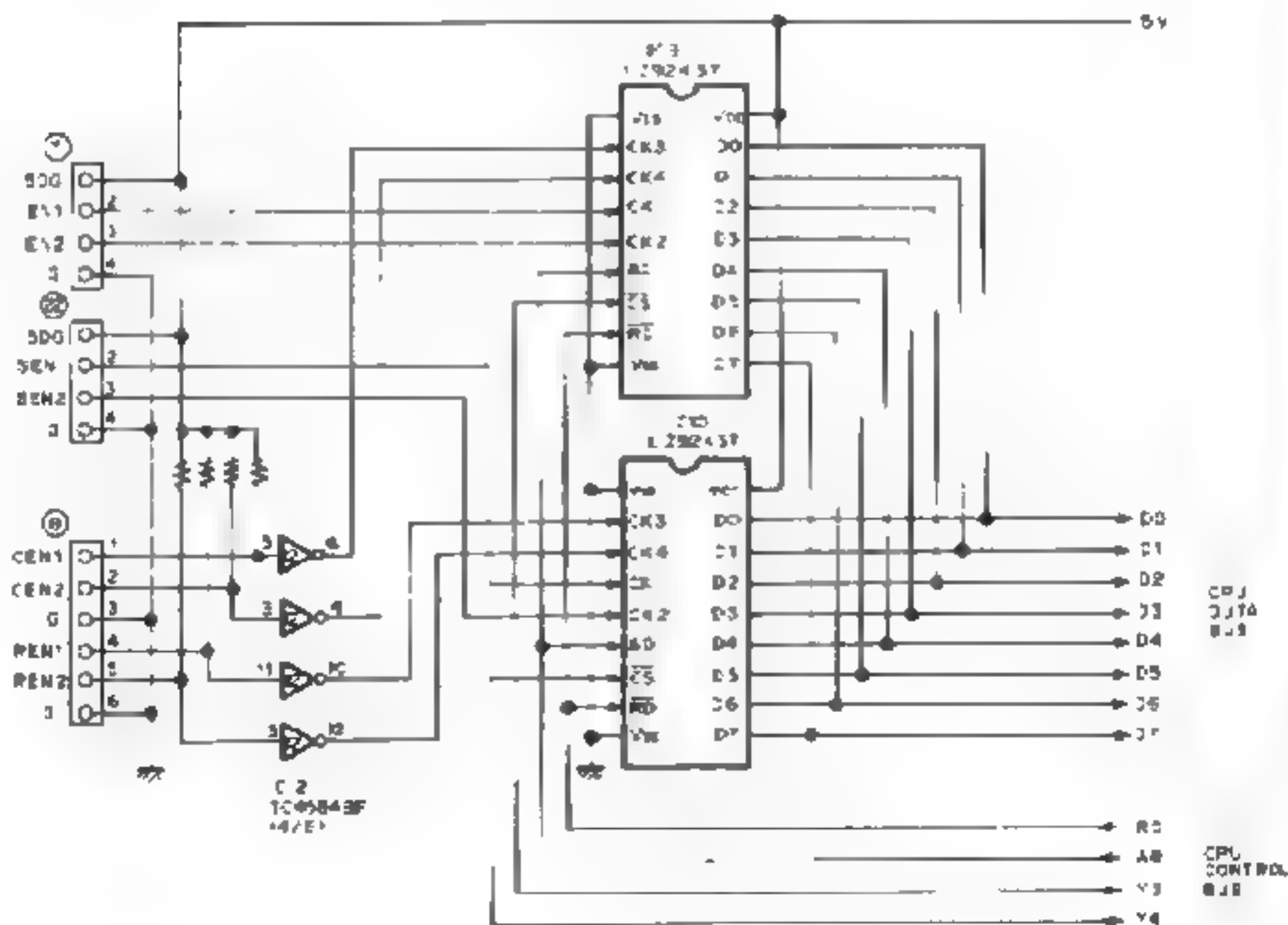
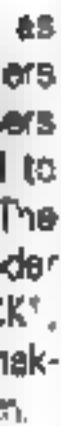


Fig. 25 Encoder circuit

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CIRCUIT DESCRIPTION

• System reset

The power supply voltage is detected by the dedicated reset IC M51951BML (IC*4). If the voltage is found to be low, the IC outputs a RESET signal to the CPU and I/O to stop operation, and back up the RAM.

When the power supply voltage becomes normal (including power on), the reset is released, the CPU and I/O are initialized after the time constant set by R5 and C*8, and operation resumes.

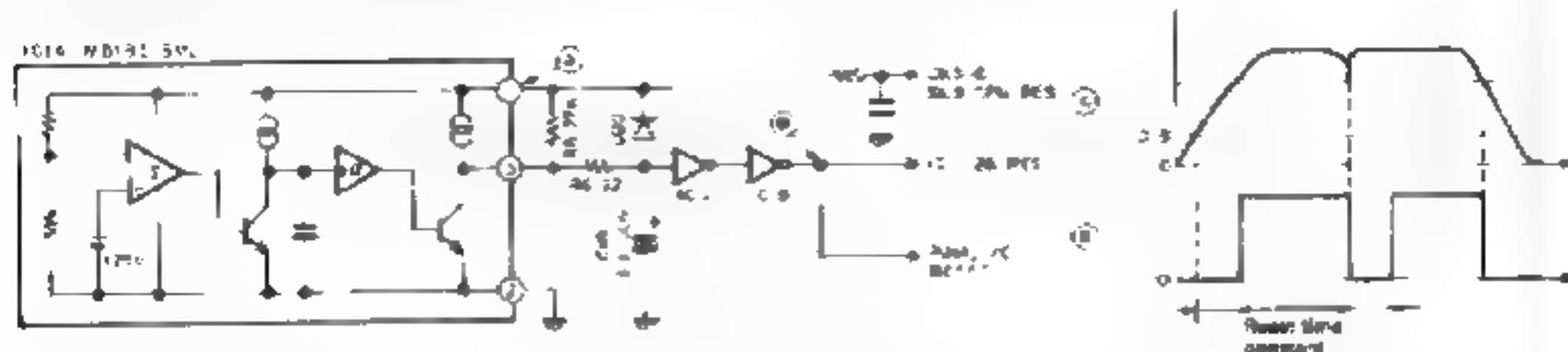


Fig. 27 System reset

• Address control

Since PD0 to PD7 of the main CPU have multiplexed address and data signals, the address signal is separated from the data signal by latching the address signal using the ALE signal provided by IC*4.

(TC74HC573AF)

PF0 to PF7 become the high-order data (A8 to A15) of the address. The address signal of A12 to A15 is used as a chip select signal for each IC by address decoder IC5 (TC74HC38AF).

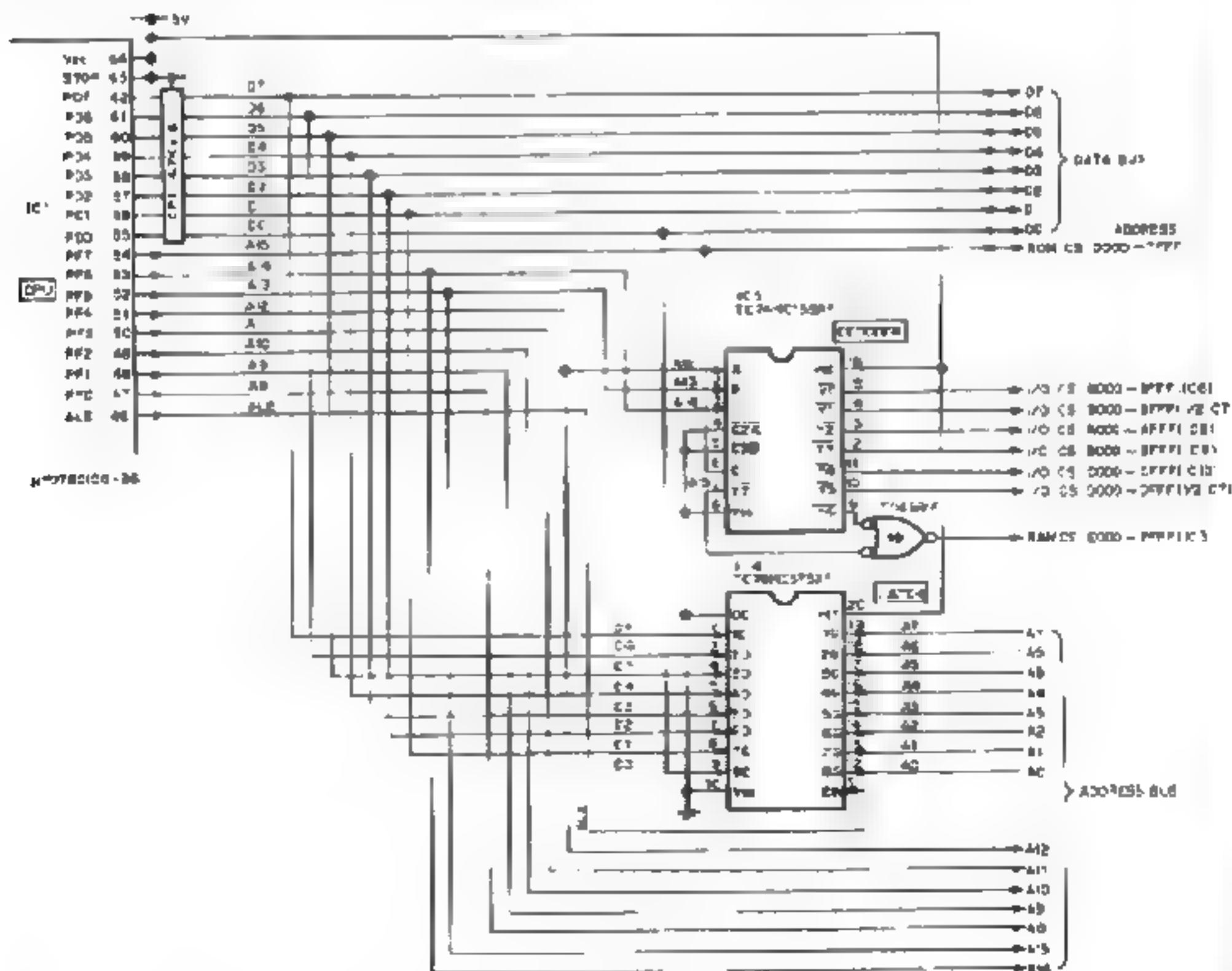


Fig. 28 Separation of address and data, address decoder circuit

CIRCUIT DESCRIPTION

• Analog signal input

The main CPU (μ PD78C10G-36) incorporates an 8-channel A/D converter, and in addition, has makes use of IC13 (MB4056) for entering 14-channel analog signals. Incoming analog signals are converted to digital values, which are used as digital data.

IC1 μ PD78C10G-36 (CPU)

Pin No.	Signal name	Description
AN0	PRM	Processor meter voltage
AN1	MET1	S/R meter voltage
AN2	MET3	A/C meter voltage
AN3	RWM	Reflected wave meter voltage
AN4	SLH	Slope tune high cut amount voltage
AN5	SLL	Slope tune low cut amount voltage
AN6	VBT	VBT amount voltage
AN7	-	Not used

IC13 MB4056 (A/D converter)

Pin No.	Signal name	Description
A0	PIT	CW pitch variable voltage
A1	CRU	USB carrier point variable voltage
A2	CPL	LSB carrier point variable voltage
A3	CPS	Sub receiver carrier point variable voltage
A4	CRW	Carrier variable voltage
A5	-	Not used
A6	PCD1	A ⁺ variable capacitor 1 position voltage
A7	PCD2	A ⁺ variable capacitor 2 position voltage

Table 9 Analog signal input

Address	
0000	Main unit, personal computer control program ROM: IC2 MBM27C256A-25
8000	I/O: IC8 CXD1095G
9000	I/O: IC7 MB89383B(1/2)
A000	I/O: IC8 CXD1095G
B000	Encoder: IC9 LZ92K37
C000	Encoder: IC10 LZ92K37
D000	I/O: IC7 MB89383B(1/2)
E000	
F000	RAM: IC3 TC5658AFL
FFFF	

Fig. 28 Memory map

• Display

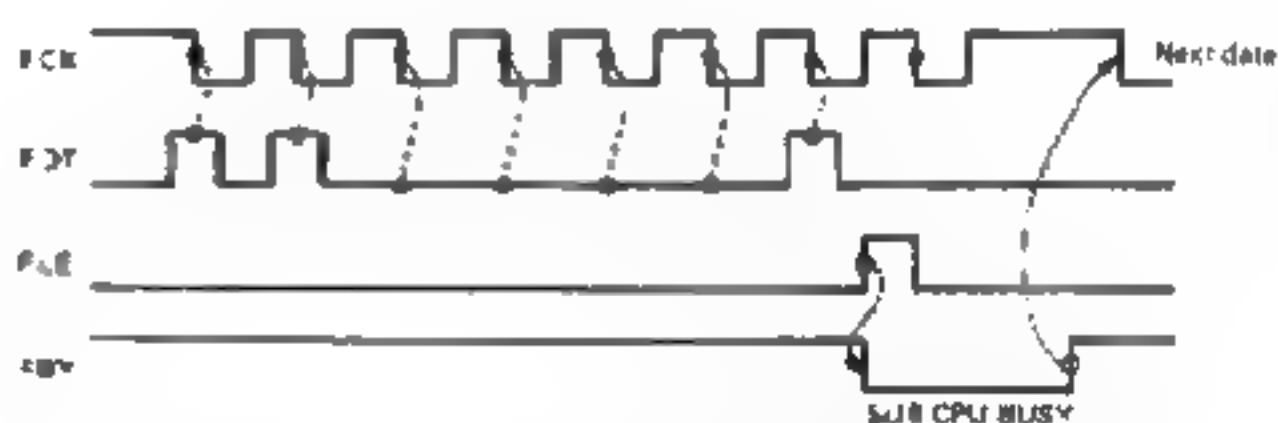
Since the TS-950 uses a large fluorescent display tube combined with a meter, a new sub CPU for the display drive has been developed. The sub CPU is located on the display unit (X54-3082-00), and is controlled by serial commands from the main CPU.

The work load on the main CPU can be decreased by making the main CPU send display data and control data to the sub CPU for display as a serial command, since the sub CPU lights the fluorescent display dynamically.

The sub CPU lights the fluorescent display dynamically according to the command data from the main CPU. Since there are 24 grids, including the meter and sub reception frequency, and the display scan speed is not sufficient to control the grids by itself, the grids are divided and scanned at high speed to avoid flickering. The sub CPU not only drives the display, but also performs other processing, such as repeater sub-tone synthesis, deeper tone, LED display, and optional VS-2 and D synthesis.

The power required to light the display is supplied by the power supply unit.

The dimmer functions by varying the duty cycle of the gate array output. A display enable signal is output from the LH pin (CN5-3) of the display unit each time one segment is displayed. This signal changes the duty cycle continuously with the one-shot multivibrator contained in NE555P of switch unit (A) (U10), and changes the brightness through the gate array.



Serial data is sent from CN5-8 FCK to CN5-1 FDT.
CN5-7 FLE: The command and number of data items are listed in the command table.
CN5-6 FBV: LSB is the first data, and the FLE (L) pulse is required for each byte.
When FBV is high after FLE (L), the next byte can be transferred.

Fig. 30 Sub CPU data transfer

CIRCUIT DESCRIPTION

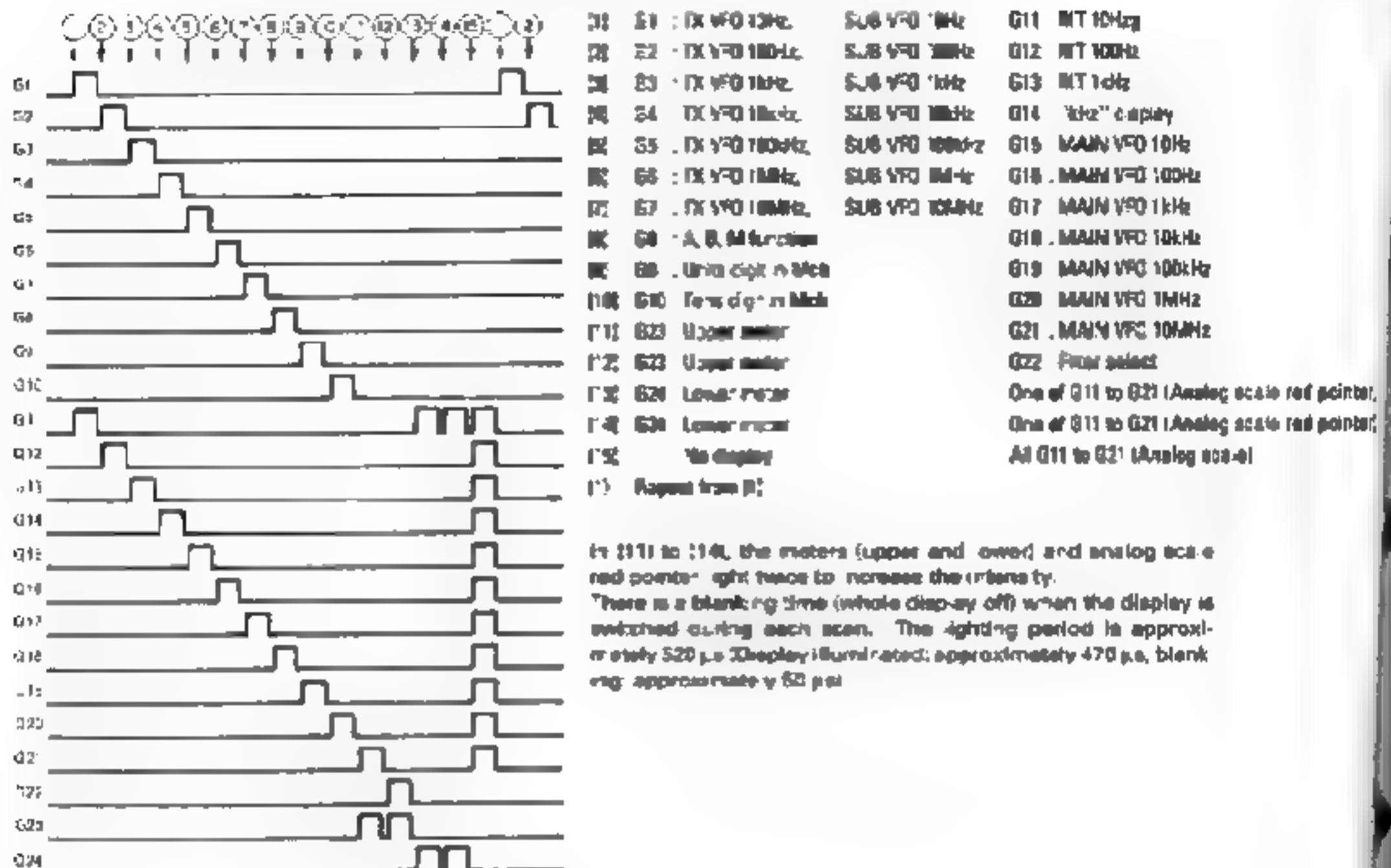


Fig. 31 Timing chart for display lighting (grid only)

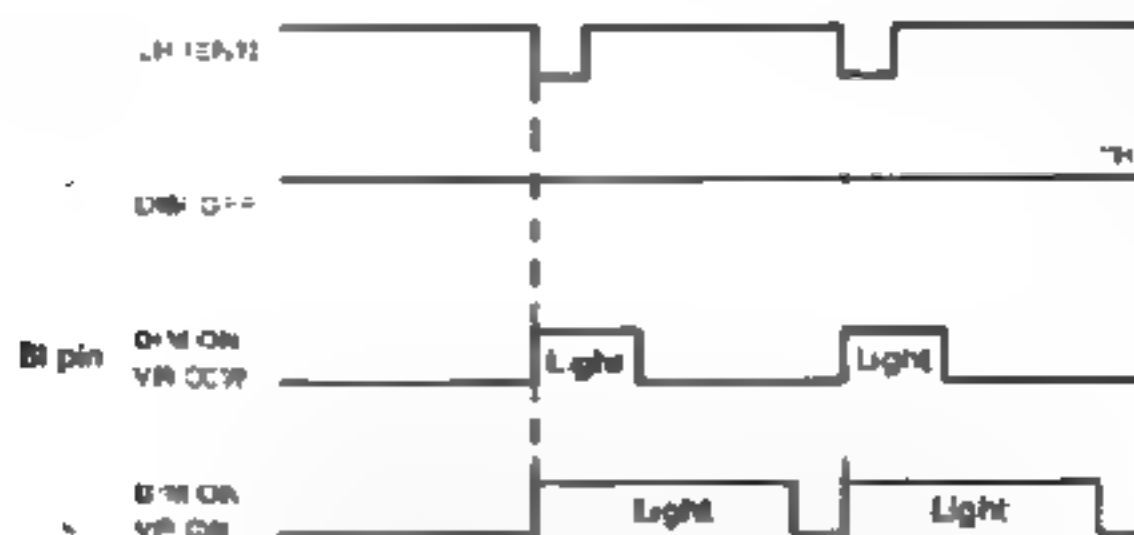


Fig. 32 LH and BI signals for driver

CIRCUIT DESCRIPTION

* PLL data

The TS-950 has 10 PLLs (11 PLLs when the DS-100 is installed).

The main CPU provides PLL data to these PLLs according to the displayed frequency.

Main VFO PLL's	3
Sub VFO PLLs	2
Local oscillator PLL's for frequency conversion	3
Main carrier oscillator PLL	1
Sub carrier oscillator PLL	1
DSP sampling frequency PLL	1

(TS-950SD type or units with DSP-10)

Since the data of these PLLs may be fixed, it is given only once when the power is switched on.

As the main encoder changes, VCO1, VCO2, and VCO3 change.

As the mode changes, VCO4, VCO5, and VCO6 change.

As the sub receiver frequency changes, VCO7 and VCO8 change.

VCO5 and VCO6 change via data from the slope tune and VBT.

Ten PLL ICs, excluding the DSP, provide unlock data signals. If one of the PLLs should unlock, the display changes to "....." (decimal points only) to indicate that the PLL is unlocked. Unlock data from each PLL is output to pin 9, A0, as UL data, so it can be checked.

Loop	VCO No.	IC	Ref. frequency/ Ref. division ratio	Variable division ratio	VCO oscillator frequency	Input terminal	Unlock signal
MAIN	LO	Up	VCO1 AF 100-145-3627-K IC1 CO-729M	500-70	75-135	71.35-120kHz	FM 11 pin A0 9 pin "H" unlock
		Middle	VCO2 P1 100-153-3108-01 IC2 CO-7253	60-110	35-317	46.5-44.5kHz	FM 11 pin A0 9 pin "H" unlock
		Down	VCO3 P1 100-153-3108-01 IC3 CO-7253	1-5000	2400-2400	93-55kHz	FM 11 pin A0 9 pin "H" unlock
	LO	2nd local oscillator	VCO4 AF 100-145-3627-K IC15 CO-729M	V mode 5-2000 2nd var FM lock 70-500	V mode 12544 2nd var FM mode 1/1	Fixed at 84.22MHz	FM 11 pin A0 9 pin "H" unlock
		3rd local oscillator	VCO5 [A] 100-153-3108-01 IC3 CO-7253	2-5000	Lower 25750	Approx 71.5MHz	FM 11 pin A0 9 pin "H" unlock
		4th local oscillator	VCO6 [A] 100-153-3108-01 IC1 CO-7253	2-5000	Lower 17750	Approx 35.5MHz	FM 11 pin A0 9 pin "H" unlock
	CAR		VCO7 [A] 100-153-3108-01 IC9 CO-7253	2-5000	Lower 20750	Approx 50.5MHz	FM 11 pin A0 9 pin "H" unlock
			VCO8 [A] 100-153-3108-01 IC8 CO-7253	2-5000	Lower 34750	Approx 69.5MHz	FM 11 pin A0 9 pin "H" unlock
	SUB	LO	VCO9 PLL 100-053-3108-01 IC17 CO-7253	2-5000	65-105	43.025-70.035MHz	AVI 13 pin A0 9 pin
		Down	VCO10 PLL 100-053-3108-01 IC13 CO-7253	2-5000	5400-6350	08-107MHz	FM 11 pin A0 9 pin "H" unlock
DSP	DSP	MAIN CAR shared	VCO11 [A] 100-153-3108-01 IC6 CO-7253	2-5000	Lower 34750	Approx 69.5MHz	FM 11 pin A0 9 pin "H" unlock
			VCO12 DSP 100-153-3108-01 IC14 CO-7253	54 16-0-130	26	Fixed at 15.35 MHz	FM 11 pin

The ref. frequency for the reference frequency of the PLL is 10MHz.

Table 10

CIRCUIT DESCRIPTION

• Key scan

The PA port and PB port of IC8 form a keyboard matrix. A scan signal (a negative pulse) is output from the PB port. One column corresponding to the PA port is selected and the state of that switch is read. When

the switch at the intersection of the matrix is pressed, the PA port bit goes low. Thus, which switch is pressed can be detected. Keys are software-debounced.

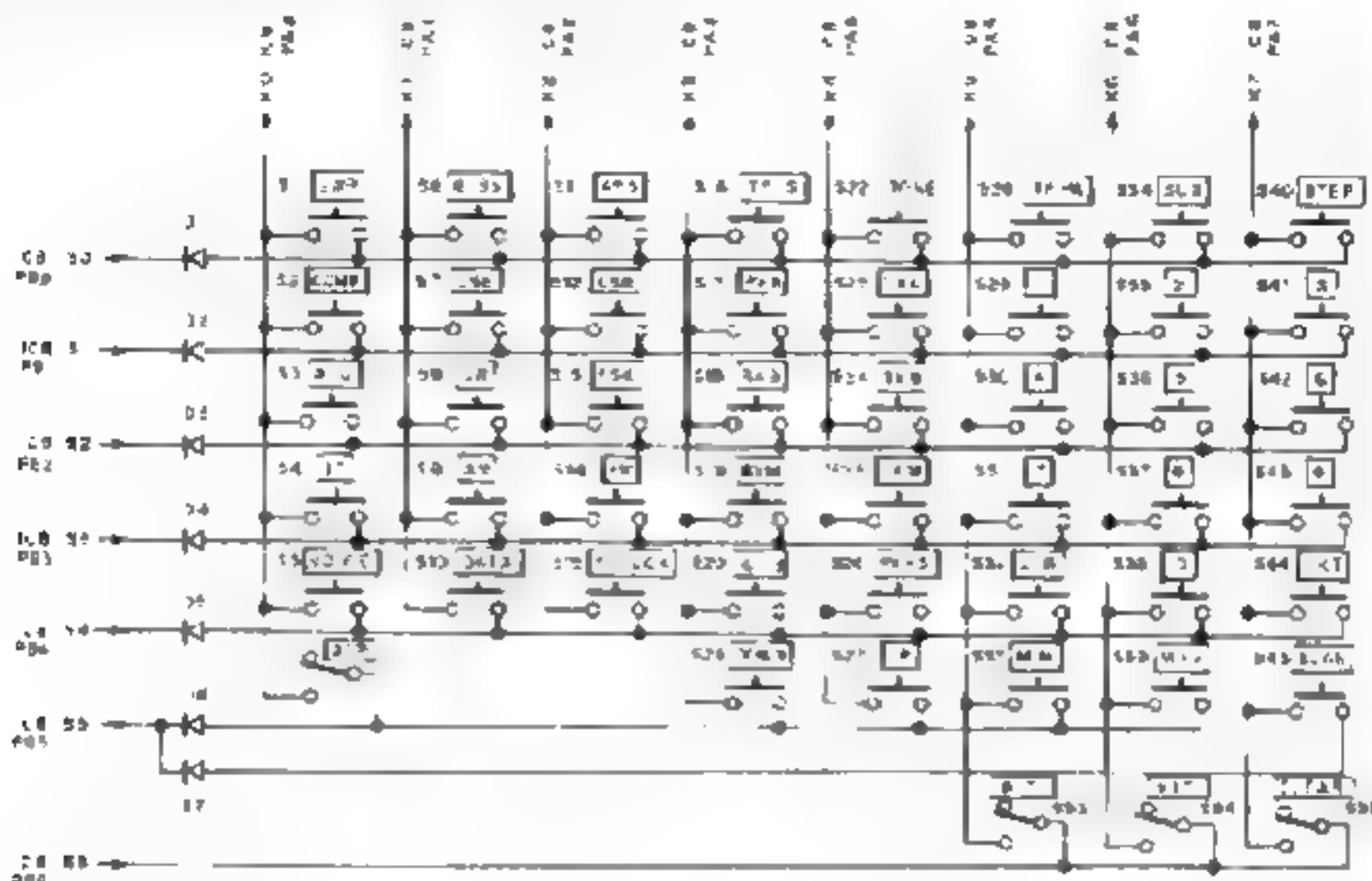


Fig. 33 Keyboard matrix

• Bandscope signal

The SM-230 Station monitor can be connected to the TS-950. The sub receiver frequency can be displayed as an intensity marker point on the SM-230 tube surface because of the simultaneous two band receive function of the main unit.

The digital unit outputs the difference between the main frequency and the sub frequency to the SM-230. The TS-950 receives bandscope scan width data from the SM-230, and outputs the sub reception frequency point at the position specified by the sweep width when the center of the tube surface is the main receive frequency. It then displays it by the intensity marker on the SM-230.

The resolution for each scan width is divided and sent by 100 divisions to the right and 100 divisions to the left from the center of the tube surface (a total of 200 divisions).

$$\pm 25 \text{ kHz} \div 50 \text{ kHz} / 200 = 250 \text{ Hz resolution}$$

The main CPU controls the main and sub receiver frequency, and calculates the direction of the sub receiver frequency as compared to the main frequency (right or left from the center of the tube surface) and

the difference between them. It is processed by the D/A converter, buffered, and output as a digital value according to the range and resolution. It is output to the SCOPE pin.

SV<C is the ON/OFF signal for sub reception. This signal turns the intensity marker on or off so that there is no intensity point when the sub receiver is off. The output is grounded by the open collector when the sub receiver is turned on.

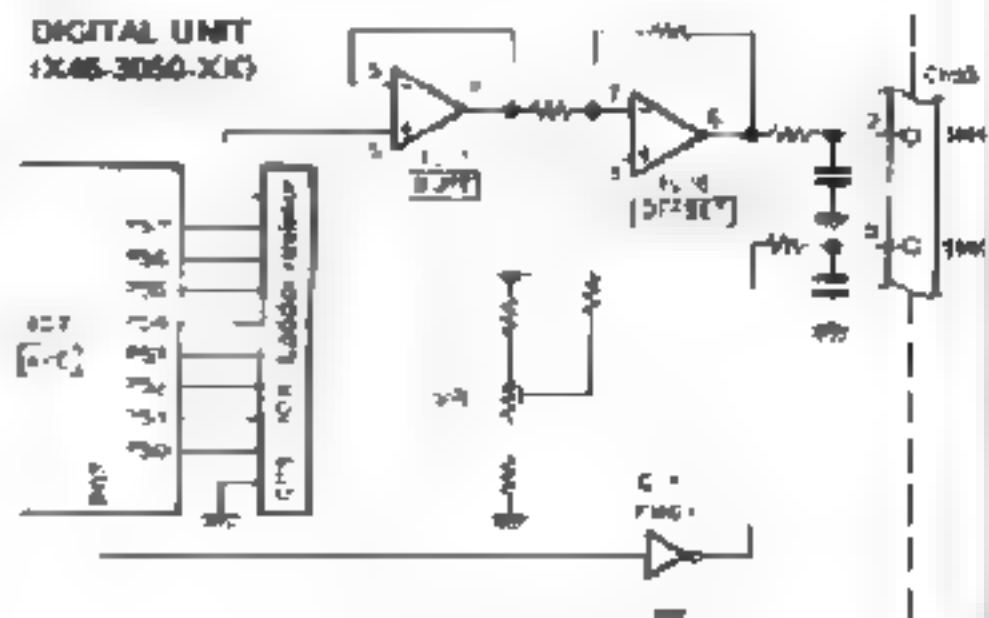


Fig. 34 Bandscope signal

CIRCUIT DESCRIPTION

• AT control

The AT band data is decoded by LPT data, and the AT tap is always switched. When the main unit begins transmission, the VSWR is calculated from the values of power and RVM (reverse power), and the VSWR signal is applied to the AT unit to display on the SWR meter and judge whether the AT tuning has been completed.

1) When AT auto switch is on

The AT unit controls the relay so that signals pass through the matching circuit, and places the AT control system in standby.

The main CPU takes the variable capacitor position set for the band from preset data, and drives it to that position. Even if the band changes, the CPU drives the capacitors to the preset position stored in memory and waits for the next operation.

2) AT TUNE on by AT auto

When both AT Auto and AT Tune are pressed at the same time, the mode is changed to CW, the filter is set to 8.83 MHz, 2.7 kHz, 455 kHz, 2.7 kHz for transmission, and the AT tune mode is set.

Since transmit is initiated by AT TUNE, the main CPU outputs the VSWR signal and waits until the tune completion signal (OK signal) arrives from the AT unit. The AT unit enters the auto tune mode, and starts tuning automatically.

The rotation angle of the variable capacitor is varied by the variable resistor connected to it. Therefore, if the variable capacitor approaches the mechanical limit

of the variable resistor, the motor rotation is reversed towards the preset side from the detector side, in the same way as for the preset setting position, and the variable capacitor position is moved to the other end of the variable resistor range, and returned to the detector side. The main CPU continues tuning, and waits until a tuning completion signal arrives.

When manual presetting is performed, the motor rotation is switched from the detector side to the preset side, and the variable capacitor position is moved by potentiometers R-tune and X-tune at the upper part of the set.

3) When the tuning is completed

When the AT unit outputs a tune completion signal (OK=LOW), the main CPU updates preset data, making that variable capacitor position the new preset value.

4) When AT tuning is off

When AT Auto or AT Tune is released, the AT Tune mode is released. The mode and filter are returned to their values before AT tuning was initiated.

• Receive bandpass filter selection (RF unit)

The RF BPF signal (RB0 to RB3) from the digital unit is buffered by Q6 and Q7 of the digital unit, and is then forwarded to the RF unit. The RF unit obtains RF BPF data divided into 16 from 4 bits using two sets of BCD-to-Decimal decoders. Band data is given in the list. RF BPF data is 4-bit parallel data.

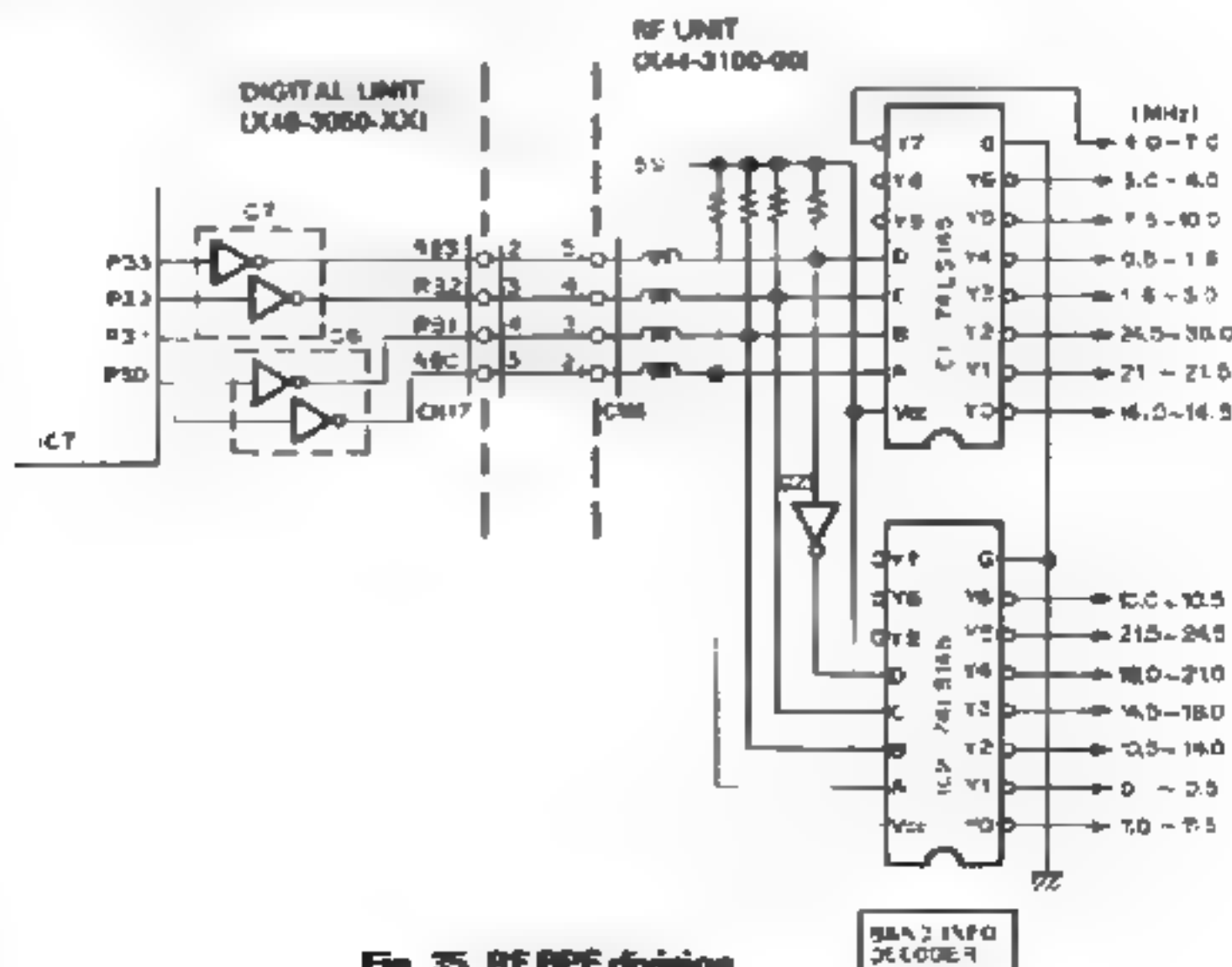


Fig. 35 RF BPF division

BAND INFO
DECODE

CIRCUIT DESCRIPTION

• IF filter switching

(455 kHz : Signal unit, 8.83 MHz : IF unit)

The IF filter switching signal from the digital unit is sent to the signal unit as 10-bit serial data. In the signal unit, serial-to-parallel converter IC8 (IC9: 74F) converts the serial data to parallel data to select the 8.83-MHz filter and the 455-kHz IF filter. IF filter select data is stored in memory as a portion of the VFC data for each mode.

The optional IF filter data is set by S1 of the digital unit, so that filter positions without filters are not selected.

The 8.83 MHz 270-Hz filter has no dedicated connection pointed in the same place as the 8.83 MHz 500-Hz filter position. 500 Hz and 270 Hz are recognized by the D-P switch, but they cannot be used at the same time.

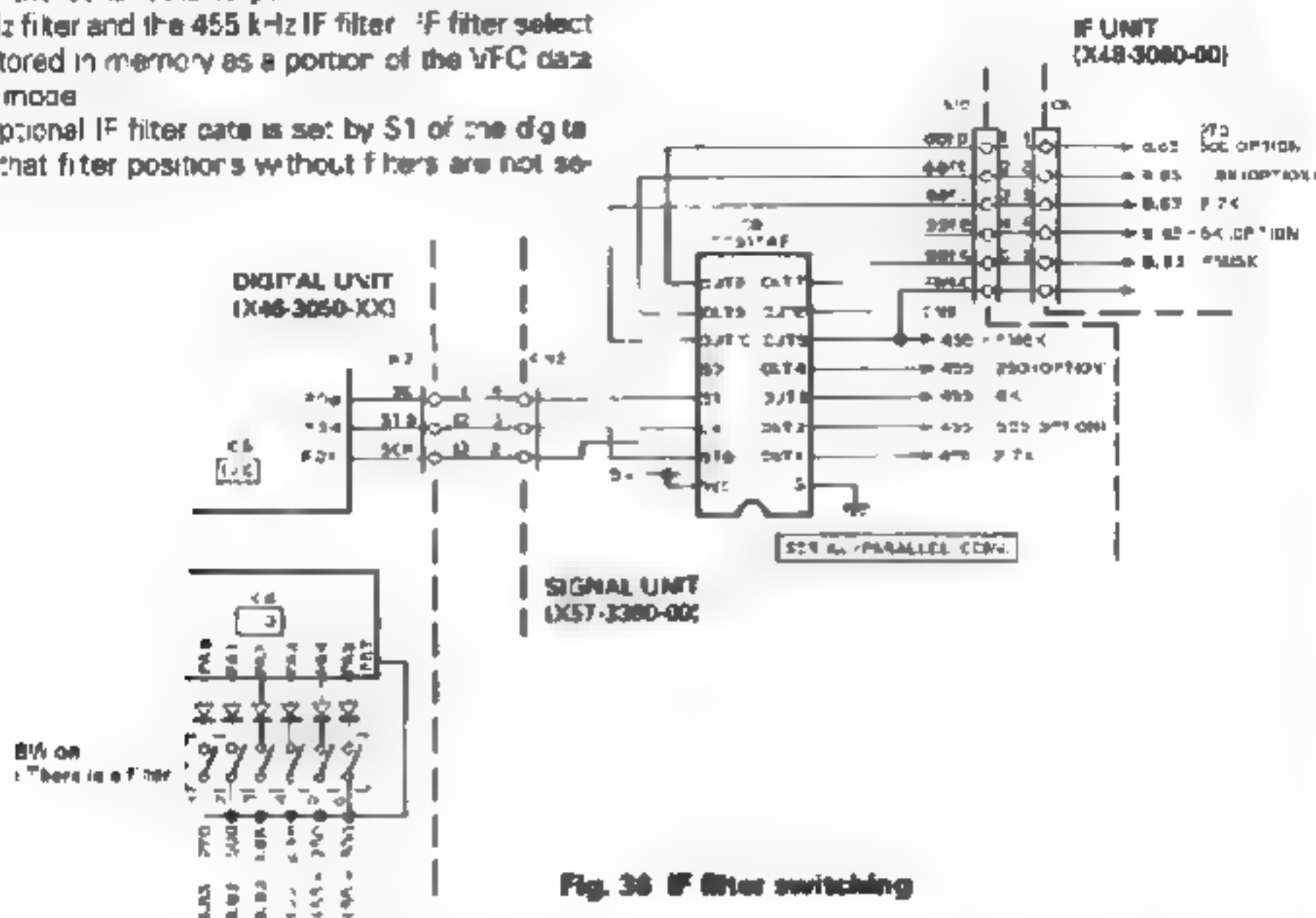


Fig. 36 IF filter switching

• Transmit LPF, AT band data (LPF unit, AT unit)

Transmit system band data (LP0 to LP3) from the digital unit is buffered by Q8 and Q9 of the digital unit. The data is then forwarded to the filter unit. The select

signal divided and decoded by the filter unit selects TX LPF in the filter unit and the AT BAND of the AT unit. For the appropriate band data, see the accompanying list.

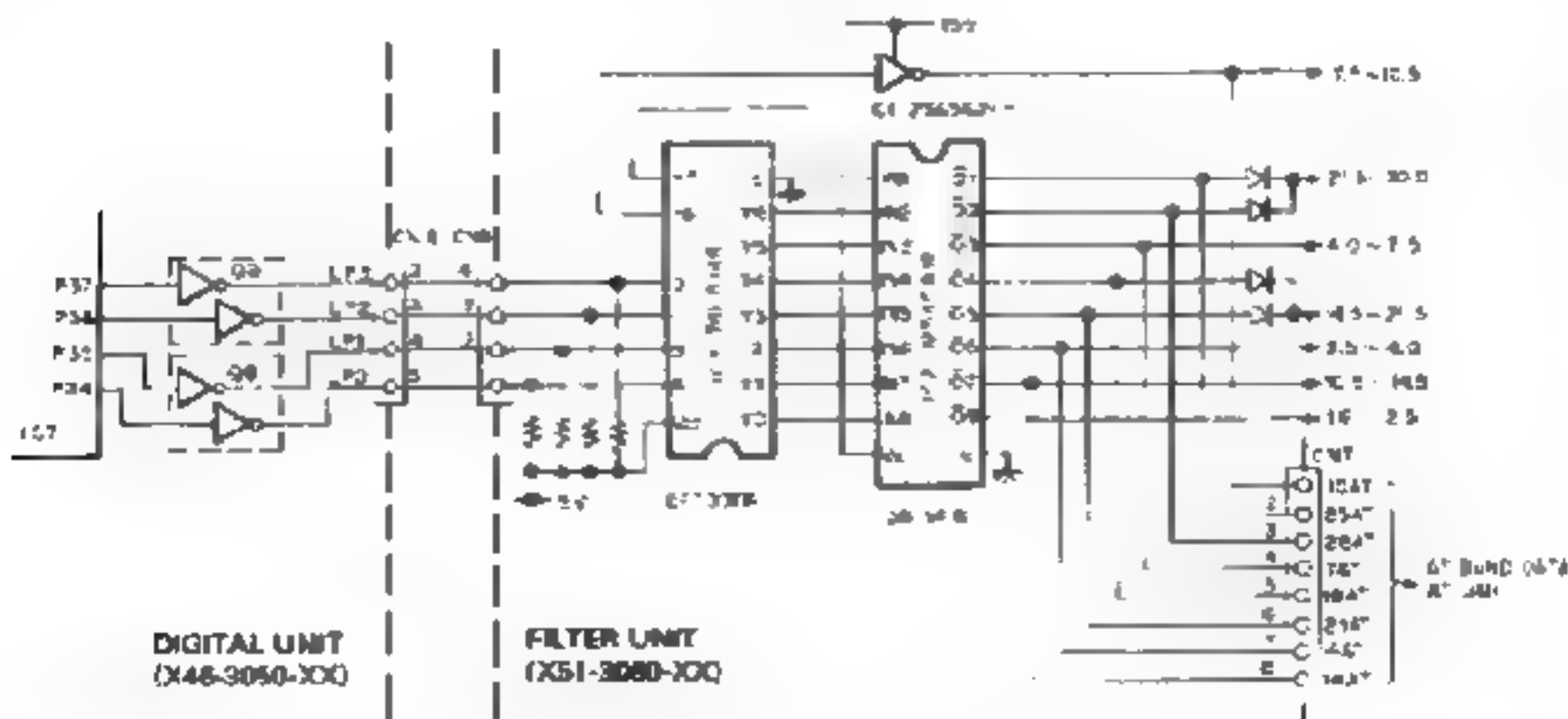


Fig. 37 Transmit LPF, AT band data

CIRCUIT DESCRIPTION

• Functions of IC pins

1) MAIN CPU : PD780148 32-BIT 1.5M 12T

	Port name	Pin No.	Name	Function	I/O	Remarks
A port	PA0	-	FDT	Fluorescent display tube, LED display data	O	
	PA1	2	FCK	Fluorescent display tube, LED display data clock	O	
	PA2	3	FLE	Fluorescent display tube, LED display data enable	O	
	PA3	4	F6V	Fluorescent display tube, LED display data busy	I	'1' Data 'H' Sub Display data to receive
	PA4	5	MFBK	Main RF blanking	O	'1' Blanking
	PA5	6	S9BK	Sub RF blanking	O	'1' Blanking
	PA6	7	-	V _{cc} used		
	PA7	8	CSS	Transmit/receive control signal	I	'H' Reception, 'L' Transmission
B port	PB0-PB2	9-11	CO-C2	External A/D 1M54055 external data	O	
	PB3	12	CS	External A/D chip select	O	'L' Chip select
	PB4	13	CLK	External A/D data clock	O	
	PB5-PB6	14,15	-	V _{cc} used		
	PB7	16	DO	External A/D data	I	
C port	PC0	17	TXD	Personal computer interface transmit signal	O	TTL level
	PC1	18	RXD	Personal computer interface receive signal	I	TTL level
	PC2	19	CTS	Personal computer interface transmit enable signal	I	TTL level
	PC3	20	-	V _{cc} used		
	PC4	21	RTS	Personal computer interface reception enable signal	O	TTL level
	PC5-PC7	22-24	-	V _{cc} used		
A/D port	AN7	41	-	V _{cc} used		
	AN6	40	V3 ⁺	A/D channel 6, VBI input	I	
	AN5	39	SLL	A/D channel 5, slope time over VBI input		
	AN4	38	S ₁ H	A/D channel 4, slope time input VBI input		
	AN3	37	WVH	A/D channel 3, reflected wave voltage input		
	AN2	36	WE ₁ 3	A/D channel 2, A.C. meter voltage input		
	AN1	35	WE ₁ 1	A/D channel 1, Signal wave meter voltage input		
	AN0	34	PPM	A/D channel 0, Process meter voltage input		
Control signals	PDC-PD7	51-52	ADC-AD7	CPU address/data bus	I/O	
	PFC-PF7	47-54	AB-A ₁ 5	CPU high-order address bus	O	
	ALE	46	ALE	Address/data selector signal	O	
	RD-WR	44,45	RD-WR	Read/Write signal	O	
	NMI	25	NMI	Non-maskable interrupt		Always 'H'
	M ₁ M0	27,29	M ₁ M0	External memory mode		Always 'H'
	AVcc	43	AVcc	Power supply for A/D converter		
	AVREF	42	AVREF	Reference power supply for A/D converter		5V
	AVSS	33	AVSS	Ground for A/D converter		
	X ₁ X2	30,31	X ₁ X2	CPU clock crystal pin		
	PES	26	PES	CPU reset signal		'L' Reset
	STOP	63	STOP	CPU stop signal		Always 'H'

2) Extended I/O : CXD1035Q (Digital unit ICB)

	Port name	Pin No.	Name	Function	I/O	Remarks
A port	PA0	54	OK	AT tune operation signal		'H' operation
	PA1	55	M/S	AT manual/auto switch signal		'L' Auto 'H' Manual
	PA2	56	ATA	AT 0% to 100% C-F frequency switch signal		'L' ON, 'H' C-F
	PA3	58	ATS	AT tune start switch signal		'L' Stop, 'H' Start
	PA4	60	U ₁	Unlock signal 1		'L' Unlock
	PA5	61	U ₂	Unlock signal 2		
	PA6	62	U ₃	Unlock signal 3		
	PA7	63	D3	DSP installation signal		'H' DSP installation

CIRCUIT DESCRIPTION

	Port name	Pin No.	Name	Function	IO	Remarks
B port	PB0	64	MCK	DSP control data clock	O	For DSP and P.L. in DSP
	PB1	3	MCK	DSP control data clock	O	For DSP and P.L. in DSP
	PB2	4	MEN	DSP control data enable	O	For DSP
	PB3	5	M.E	DSP control data enable	O	For P.L. in DSP
	PB4	6	STB	Serial-to-parallel converter IC data enable	O	TC9174F
	PB6	7	HPC	AP on/off signal	C	'L' OFF, 'H' ON
	PB6	8	PC<	PLL control data clock	O	
	PB7	9	PDA	PLL control data	O	
C port	PC0	11	PLE7	PLL control data enable 7	C	For VCO7
	PC1	12	PLE6	PLL control data enable 6	C	For VCO6
	PC2	13	PLE5	PLL control data enable 5	C	For VCO6
	PC3	14	PLE5	PLL control data enable 5	C	For VCO6
	PC4	15	PLE3	PLL control data enable 3	C	For VCO3
	PC5	16	PLE9	PLL control data enable 9	C	For VCO8
	PC6	17	PLE2	PLL control data enable 2	C	For VCO2
	PC7	18	PLE4	PLL control data enable 4	C	For VCO4
D port	PD0	20	SD	Serial-to-parallel converter IC data	O	TC9174F
	PD1	21	CK	Serial-to-parallel converter IC data clock	C	
	PD2	22	CA<C	DATA mode	C	'H' Mode is selected
	PD3	23	FSK<	FSK mode	C	
	PD4	24	AM<	AM mode	C	
	PD6	27	CW<	CW mode	O	
	PD6	28	FM<	FM mode	O	
	PD7	29	SSB<	SSB mode	C	
E port	PE0	40	A MS	ME< select signal	C	'L' = meter "H" = ALC meter
	PE1	50	-	Not used		
	PE2	52	TX	Transmit disable signal	C	'H' = transmit disable
	PE3	53	ESS	Personal monitor interface bus master request signal	O	'H' = transmission request
Control signal	DO-D7	30-32,35-36	DO-D7	Data bus	IO	
	RD-WR	44,43	RD-WR	Read/Write signal		
	A0-A2	48-48	A0-A2	Port select signal	I	
	CS<N	41	CS<N	Chip select signal	I	After reset, all ports become input ports
CS	45	CS	Chip select signal			

3) Extended I/O M8000000 (Digital unit IC7)

	Port name	Pin No.	Name	Function	IO	Remarks
A port (P00)	P00	28	SLE<	FSK control shift data 1	O	
	P01	27	SLE2	FSK control shift data 2	O	
	P02	26	SLE3	FSK control shift data 3	O	
	P03	25	APR<	AT variable capacitor signal	O	'L' Manual, 'H' Auto
	P04-P06	23-21	-	Not used		
	P07	20	SMK<	SW-ZD sub-master control signal	O	'L' OFF, 'H' ON
B port (P10)	P10-P17	44-31	PR<1	AT variable capacitor 1 preset D/A data	O	
C port (P20)	P20-P27	34-40,43	PR<2	AT variable capacitor 2 preset D/A data	O	
D port (P30)	P30-P33	77-80	FB0-F33	Receive band data	O	
	P34-P37	1-4	PD-L P3	Transmit band data	O	
E port (P40)	P40-P47	54-61	VSW<N	AT SW<N D/A data	O	
F port (P50)	P50-P57	62,65-71	SMK<2	SW-ZD sub-master control D/A data	O	

CIRCUIT DESCRIPTION

	Port name	Pin No.	Name	Function	I/O	Remarks
Control signal	D30-D37	12-19	D30-D37	Data bus	I/O	
	RD,WR	78,5	RD,WR	Read/Write signal		
	RES	8	RES	Reset signal	I	Reset
	A0,A1	31,32	A0,A1	Port select signal		
	CS0	29	CS0	Chip select signal	I	P0X-P2X is select
	CS1	75	CS1	Chip select signal	I	P3X-P5X is select

4) Extended I/O CXD1095Q (Digital unit IC2)

	Port name	Pin No.	Name	Function	I/O	Remarks
A port	PA0-PA7	54-63	KA0-K7	Key input	I	
B port	PB0-PB7	64,3-9	SB0-S7	Key matrix select signal	I	
C port	PC0	1	SABK	Sub AF banking	O	'H' Banking
	PC1	2	MABK	Main AF banking	O	'H' Banking
	PC2	3	PLE0	P.L. control data enable 0	O	For VCO0
	PC3	4	PLE1	P.L. control data enable 1	O	For VCO1
	PC4-PC7	15-18	VBA-V3D	PLL band data	O	
D port	PDD	20	RG1	SH-230 sweep width rate 1	I	
	PD1	21	RG0	SH-230 sweep width rate 0	I	
	PD2-PD5	22-25	-	Not used		
	PD7	28	FAS	Filter DIP switch select signal	O	
E port	PE0	49	MCS	Transfer each monitor search signal	I	'L' OFF 'H' ON
	PE1	50	-	Not used		
	PE2	52	MC	M/C down switch signal	O	'L' ON
	PE3	53	MC	M/C up switch signal	O	'H' ON
Control signal	D0-D7	30-37,35-38	D0-D7	Data bus	I/O	
	RD,WR	44,43	RD,WR	Read/Write signal		
	A0-A2	46-48	A0-A2	Port select signal		
	ODEN	41	ODEN	Output disable signal		When used as input become input port
	CS	45	CS	Chip select signal		

5) Extended I/O (A/D converter) : MS4056 (Digital unit IC12)

	Port name	Pin No.	Name	Function	I/O	Remarks
A/D port	A0	2	PIF	A/D channel 0 carrier VR input	I	
	A1	3	CR1	A/D channel 1 carrier JS3 VR input	I	
	A2	4	CR2	A/D channel 2 carrier JS4 VR input	I	
	A3	5	CR3	A/D channel 3 carrier sub VR input	I	
	A4	6	CR4	A/D channel 4 carrier window VR input	I	
	A5	7	-	Not used		
	A6	8	POD1	A/D channel 5 A+ variable detector position VR1 input	I	
	A7	9	POD2	A/D channel 7 A+ variable detector position VR2 input	I	
Control signal	C0-C2	12-14	C0-C2	Channel select signal	I	
	CLK	16	CLK	A/D data select signal	I	
	CS	15	CS	Chip select	I	
	DO	17	DO	A/D data	O	
	Vref	19	Vref	A/D reference power supply	O	5V
	RS	18	FS	Range select signal	I	Always 'H'
	SD	11	SD	Converter mode signal	I	Always 'H'

CIRCUIT DESCRIPTION

④ SUB CPU HD643180X0F96 (Display unit IC1)

	Port name	Pin No.	Name	Function	I/O	Remarks
A port	PA0	54	LFSK	FSK mode LED	O	'H' LED on
	PA1	55	L53	LSB mode LED	O	'H' LED on
	PA2	56	LUSB	USB mode LED	O	'H' LED on
	PA3	57	LFM	FM mode LED	O	'H' LED on
	RXS	58	ED7	Sub CPU serial data input		
	CKS	59	FCX	Sub CPU serial clock input	I	
	PA6	60	LAM	AM mode LED	O	'H' LED on
	PA7	61	LCW	CW mode LED	O	'H' LED on
E port	PE0	23				
	PE1	24				
	PE2	25	BSY	VS-2 busy input	I	'H' VS-2 busy
	PE3	26	TR	TX/RX input	I	'H' TX, 'L' RX
Control port	PC0-PC7	8-14	AC-A7	CPU low-order address bus	O	
	PD0-PD7	15-22	AB-A7	CPU high-order address bus	O	
	PE0-PE7	30-37	DB-D7	CPU data bus	IO	
	NMI	1	NMI	Interrupt input for submicro system		
	INT-INT2	2-4	INT-A7	Not used		Fixed at 'H' level
	RTS	45	TX2	750 Hz tone control output	O	TX ON (750 Hz), TX OFF
	MP0, MP1	72, 73	MP0, MP1	CPU mode setting input	I	MP0 'L', MP1 'H' fixed
	BUSPO	79	BUSPO	Not used	I	Fixed 'H' level
	WAIT	77	WAIT	Not used	I	Fixed 'H' level
	EXTX, XTAL	74, 75	EXTX, XTAL	Crystal connection pin	I	16.1 MHz

⑤ Data array HD6422180PP (Display unit IC2)

	Port name	Pin No.	Name	Function	I/O	Remarks
P0 port	P00	34	Pa1	Fluorescent display tube segment a1 drive output	O	For TX VFO display
	P01	35	Pb1	Fluorescent display tube segment b1 drive output	O	7 segments (upper right)
	P02	36	Pc1	Fluorescent display tube segment c1 drive output	O	'H' Active
	P03	37	Pd1	Fluorescent display tube segment d1 drive output	O	
	P04	38	Pe1	Fluorescent display tube segment e1 drive output	O	
	P05	39	Pf1	Fluorescent display tube segment f1 drive output	O	
	P06	40	Pg1	Fluorescent display tube segment g1 drive output	O	
	P07	41	Ph1	Fluorescent display tube segment h1 drive output	O	
P1 port	P10	43	Pa2	Fluorescent display tube segment a2 drive output	O	For sub VFO display
	P11	44	Pb2	Fluorescent display tube segment b2 drive output	O	7 segments (yellow)
	P12	45	Pc2	Fluorescent display tube segment c2 drive output	O	'H' Active
	P13	46	Pd2	Fluorescent display tube segment d2 drive output	O	
	P14	47	Pe2	Fluorescent display tube segment e2 drive output	O	
	P15	48	Pf2	Fluorescent display tube segment f2 drive output	O	
	P16	49	Pg2	Fluorescent display tube segment g2 drive output	O	
	P17	50	Ph2	Fluorescent display tube segment h2 drive output	O	
	P20	56	Pa3	Fluorescent display tube segment a3 drive output	O	For main VFO display
	P21	57	Pb3	Fluorescent display tube segment b3 drive output	O	7 segments (Center)
P2 port	P22	58	Pc3	Fluorescent display tube segment c3 drive output	O	'H' Active
	P23	59	Pd3	Fluorescent display tube segment d3 drive output	O	
	P24	60	Pe3	Fluorescent display tube segment e3 drive output	O	
	P25	61	Pf3	Fluorescent display tube segment f3 drive output	O	
	P26	62	Pg3	Fluorescent display tube segment g3 drive output	O	
	P27	63	Ph3	Fluorescent display tube segment h3 drive output	O	

CIRCUIT DESCRIPTION

	Port name	Pin No.	Name	Function	VO	Remarks
P3 port	P30	63	P1G	Fluorescent display tube grid 1G drive output	0	Grid select signal
	P31	64	P2G	Fluorescent display tube grid 2G drive output	0	The rightmost grid of the display tube is 11G! "H" Active
	P32	65	P3G	Fluorescent display tube grid 3G drive output	0	
	P33	67	P4G	Fluorescent display tube grid 4G drive output	0	
	P34	68	P5G	Fluorescent display tube grid 5G drive output	0	
	P35	69	P6G	Fluorescent display tube grid 6G drive output	0	
	P36	70	P7G	Fluorescent display tube grid 7G drive output	0	
	P37	71	P8G	Fluorescent display tube grid 8G drive output	0	
P4 port	P40	72	P9G	Fluorescent display tube grid 9G drive output	0	"H" Active
	P41	73	P10G	Fluorescent display tube grid 10G drive output	0	
	P42	74	P11G	Fluorescent display tube grid 11G drive output	0	
	P43	75	P12G	Fluorescent display tube grid 12G drive output	0	
	P44	84	P13G	Fluorescent display tube grid 13G drive output	0	
	P45	85	P14G	Fluorescent display tube grid 14G drive output	0	
	P46	86	P15G	Fluorescent display tube grid 15G drive output	0	
	P47	87	P16G	Fluorescent display tube grid 16G drive output	0	
P5 port	P50	88	P17G	Fluorescent display tube grid 17G drive output	0	"H" Active
	P51	89	P18G	Fluorescent display tube grid 18G drive output	0	
	P52	91	P19G	Fluorescent display tube grid 19G drive output	0	
	P53	92	P20G	Fluorescent display tube grid 20G drive output	0	
	P54	93	P21G	Fluorescent display tube grid 21G drive output	0	
	P55	94	P22G	Fluorescent display tube grid 22G drive output	0	
	P56	95	P23G	Fluorescent display tube grid 23G drive output	0	
	P57	96	P24G	Fluorescent display tube grid 24G drive output	0	
P6 port	P60	97	PA1	Fluorescent display tube segment A1 drive output	0	"H" Active, analog scale "H" Active for 30 pointer display "H" Active
	P61	98	PA2	Fluorescent display tube segment A2 drive output	0	
	P62	99	PB	Fluorescent display tube segment B drive output	0	
	P63	100	PC	Fluorescent display tube segment C drive output	0	
	P64	1	PD	Fluorescent display tube segment D drive output	0	
	P65	2	PE1	Fluorescent display tube segment E1 drive output	0	
	P66	5	PE2	Fluorescent display tube segment E2 drive output	0	
	P67	6	-	Not used	0	
P7 port	P70	7	PCC	Fluorescent display tube segment CC drive output	0	Meter scale select signal: "H" Active
	P71	8	PDC	Fluorescent display tube segment DD drive output	0	
	P72	9	PCC	Fluorescent display tube segment EE drive output	0	
	P73	10	PEE	Fluorescent display tube segment EE drive output	0	
	P74	11	FS1	Fluorescent display tube segment 1 drive output	0	Red letter display segment
	P75	12	FS3	Fluorescent display tube segment 3 drive output	0	"H" Active
	P76	13	FS3	Fluorescent display tube segment 3 drive output	0	For kHz display "H" Active
	P77	14	PALL	Fluorescent display tube segment AL drive output	0	For analog scale display "H" Active
Control port	D0-D7	24-33	D0-D7	CPL data bus	40	
	A0-A2	21-23	A0-A2	CPL address bus	1	
	NPES	15	NPES	Reset input	1	"L" Reset
	NRD	17	NRD	RD strobe	1	"L" Read
	NWR	18	NWR	WR strobe	1	"L" Write
	NCS1	19	NCS1	Chip select 1	1	"L" Active
	NCS0	20	NCS0	Chip select 0	1	"L" Active
	ENC	51	ENC	Output control 0	1	"H" Active
	EN1	52	EN1	Output control 1	1	"H" Active
	CKI	61	CKI	Display control flip-flop clock	1	
	NCU	62	NCU	Display control flip-flop clear	1	
	DOU*	63	DOU*	Display control flip-flop output	0	
	D1R0	76	D1R0	Port A0 specification 0	1	Fixed "L" level
	D1R1	77	D1R1	Port A0 specification 1	1	Fixed "L" level

CIRCUIT DESCRIPTION

⑥ Gate array MB622100PF (Display unit IC3)

Port name	Pin No.	Pin Name	Function	VO	Remarks
PC port	P00	34	PPA/R	Fluorescent display tube segment PPA drive output	0
	P01	35	PS	Fluorescent display tube segment S drive output	0
	P02	36	PL30	Fluorescent display tube segment L30 drive output	0
	P03	37	PL29	Fluorescent display tube segment L29 drive output	0
	P04	38	PL28	Fluorescent display tube segment L28 drive output	0
	P05	39	PL27	Fluorescent display tube segment L27 drive output	0
	P06	41	PL26	Fluorescent display tube segment L26 drive output	0
	P07	42	PL25	Fluorescent display tube segment L25 drive output	0
P1 port	P10	43	PL24	Fluorescent display tube segment L24 drive output	0
	P11	44	PL23	Fluorescent display tube segment L23 drive output	0
	P12	45	PL22	Fluorescent display tube segment L22 drive output	0
	P13	46	PL21	Fluorescent display tube segment L21 drive output	0
	P14	47	PL20	Fluorescent display tube segment L20 drive output	0
	P15	48	PL19	Fluorescent display tube segment L19 drive output	0
	P16	49	PL18	Fluorescent display tube segment L18 drive output	0
	P17	50	PL17	Fluorescent display tube segment L17 drive output	0
P2 port	P20	55	PL16	Fluorescent display tube segment L16 drive output	0
	P21	56	PL15	Fluorescent display tube segment L15 drive output	0
	P22	57	PL14	Fluorescent display tube segment L14 drive output	0
	P23	58	PL13	Fluorescent display tube segment L13 drive output	0
	P24	59	PL12	Fluorescent display tube segment L12 drive output	0
	P25	60	PL11	Fluorescent display tube segment L11 drive output	0
	P26	61	PL10	Fluorescent display tube segment L10 drive output	0
	P27	62	PL9	Fluorescent display tube segment L9 drive output	0
P3 port	P30	63	PL8	Fluorescent display tube segment L8 drive output	0
	P31	64	PL7	Fluorescent display tube segment L7 drive output	0
	P32	66	PL6	Fluorescent display tube segment L6 drive output	0
	P33	67	PL5	Fluorescent display tube segment L5 drive output	0
	P34	68	PL4	Fluorescent display tube segment L4 drive output	0
	P35	69	PL3	Fluorescent display tube segment L3 drive output	0
	P36	70	PL2	Fluorescent display tube segment L2 drive output	0
	P37	71	PL1	Fluorescent display tube segment L1 drive output	0
P4 port	P40	72	P6B	Fluorescent display tube segment 6B drive output	0
	P41	73	PAA	Fluorescent display tube segment AA drive output	0
	P42	74	PU30	Fluorescent display tube segment J30 drive output	0
	P43	75	PU29	Fluorescent display tube segment J29 drive output	0
	P44	84	PU28	Fluorescent display tube segment J28 drive output	0
	P45	85	PU27	Fluorescent display tube segment J27 drive output	0
	P46	86	PU26	Fluorescent display tube segment J26 drive output	0
	P47	87	PU25	Fluorescent display tube segment J25 drive output	0
P5 port	P50	88	PU24	Fluorescent display tube segment J24 drive output	0
	P51	89	PU23	Fluorescent display tube segment J23 drive output	0
	P52	91	PU22	Fluorescent display tube segment J22 drive output	0
	P53	92	PU21	Fluorescent display tube segment J21 drive output	0
	P54	93	PU20	Fluorescent display tube segment J20 drive output	0
	P55	94	PU19	Fluorescent display tube segment J19 drive output	0
	P56	95	PU18	Fluorescent display tube segment J18 drive output	0
	P57	96	PU17	Fluorescent display tube segment J17 drive output	0

CIRCUIT DESCRIPTION

	Port name	Pie No.	Name	Function	IO	Remarks
PB port	PB0	97	PU' 8	Fluorescent display tube segment U' 8 drive output	0	Upper meter segment "H" Active
	PB1	98	PU' 5	Fluorescent display tube segment U' 5 drive output	0	
	PB2	99	PU' 4	Fluorescent display tube segment U' 4 drive output	0	
	PB3	100	PU' 3	Fluorescent display tube segment U' 3 drive output	0	
	PB4	1	PU' 2	Fluorescent display tube segment U' 2 drive output	0	
	PB5	2	PU' 1	Fluorescent display tube segment U' 1 drive output	0	
	PB6	3	PL' 10	Fluorescent display tube segment U' 10 drive output	0	
	PB7	4	PU' 9	Fluorescent display tube segment U' 9 drive output	0	
PT port	PT0	7	PU' 6	Fluorescent display tube segment U' 6 drive output	0	Upper meter segment "H" Active
	PT1	8	PU' 7	Fluorescent display tube segment U' 7 drive output	0	
	PT2	9	PU' 8	Fluorescent display tube segment U' 8 drive output	0	
	PT3	10	PU' 5	Fluorescent display tube segment U' 5 drive output	0	
	PT4	11	PU' 4	Fluorescent display tube segment U' 4 drive output	0	
	PT5	12	PL' 3	Fluorescent display tube segment U' 3 drive output	0	
	PT6	13	PL' 2	Fluorescent display tube segment U' 2 drive output	0	
	PT7	14	PL' 1	Fluorescent display tube segment U' 1 drive output	0	
Control port	D0-D7	24-33	D0-D7	CPU data bus	IO	
	A0-A2	21-23	A0-A2	CPU address bus	I	
	NRES	16	NRES	Reset input	I	"L" Reset
	NRD	17	NRD	RD strobe	I	"L" Read
	NWR	18	NWR	WP strobe	I	"L" Write
	NCS'	19	NCS'	Chip select 1	I	"L" Active
	NCS0	20	NCS0	Chip select 0	I	"L" Active
	EN0	51	EN0	Output control 0	O	"H" Active
	EN1	52	EN1	Output control 1	O	"H" Active
	CKI	61	CKI	Main CPU busy control "Go-Stop" clock		
	VCJ	62	VCJ	Main CPU busy control "Go-Stop" clear		
	DOUT	63	DOUT	Main CPU busy control "Go-Stop" output	0	
	CIR0	76	CIR0	Port I/O specification 0		Fixed "L" level
	CIR1	77	CIR1	Port I/O specification 1		Fixed "L" level

BI Latch : TC74HC574AP (Display unit IC5)

	Port name	Pie No.	Name	Function	IO	Remarks
Q port	Q0	19	-	Not used	0	
	Q1	18	LTM	TX-A LED output	0	"H" LED on
	Q2	17	LTA	TX-B LED output	0	"H" LED on
	Q3	16	LTB	TX-C LED output	0	"H" LED on
	Q4	15	LK'	Numeric keys C to 9 LED output	0	"H" LED on
	Q5	14	LRM	RX-A LED output	0	"H" LED on
	Q6	13	LRA	RX-B LED output	0	"H" LED on
	Q7	12	LFB	RX-C LED output	0	"H" LED on

CIRCUIT DESCRIPTION

AVR Unit

The power supply unit produces +15 V thru the use of a discrete IC, +5 V and -12 V via 3-pin regulator IC's, and -40 V thru the use of a zener diode and transistor.

The +15V circuit is every similar to the +28V circuit of the TS-940. When the power is switched on, Q2 is turned on via start resistors R3 and R24 and current flows. A voltage is generated at R8 and R9. Error amplifier transistor Q4 is turned on while Q1 is turned on.

The circuit operates as a constant-voltage circuit with a reference voltage of 7.5 V which is produced by zener diode. Diode D2 (negative temperature coefficient) is used to compensate for the temperature (positive temperature coefficient) of this zener diode. A current of up to 5.5 A flows through Q2, resulting in a collector loss of approximately 35 W. R4 is a resistor that is used for stabilization, and has a current flow of approximately 100 mA to stabilize operation even if there is no load.

If the +15 V line is shorted, F1 (7.5-A quick-blow fuse) blows to protect the circuit.

The +5 V is generated from the +15 V line by a 3-pin regulator IC.

-40 V is produced by two -20V zener diodes, and boosted by Q5. R13 is a protection resistor, and R14 and R23 are resistors for discharging C30 and C34.

When the temperature of the power supply radiator reaches 80°C, thermal switch S2 is turned on, and a fan start voltage of approximately 7 V is generated by D4. The fan begins running at a low speed. When the temperature of the transformer rises to 80°C, S1 turns off, and Q3 turns on. The fan voltage then becomes approximately 12 V, and the fan rotates at high speed, while a powerdown signal (approximately 5 V) is output (CN6-1, TPT).

Digital Modulation Function

This transceiver is capable of providing the SSB, CW, AM and FSK modulation, generating or FM carrier, and providing the AF slope tune during the SSB receive by using the input signals from the microphone and a 16-bit A/D, D/A converter for CW and FSK keying and DSP (Digital Signal Processor).

• Features of each mode

1) SSB mode

Modulated waves of higher-quality than those in the SSB mode are obtained through modulation by the 10th phase-shift network that digitally treats signals.

2) CW mode

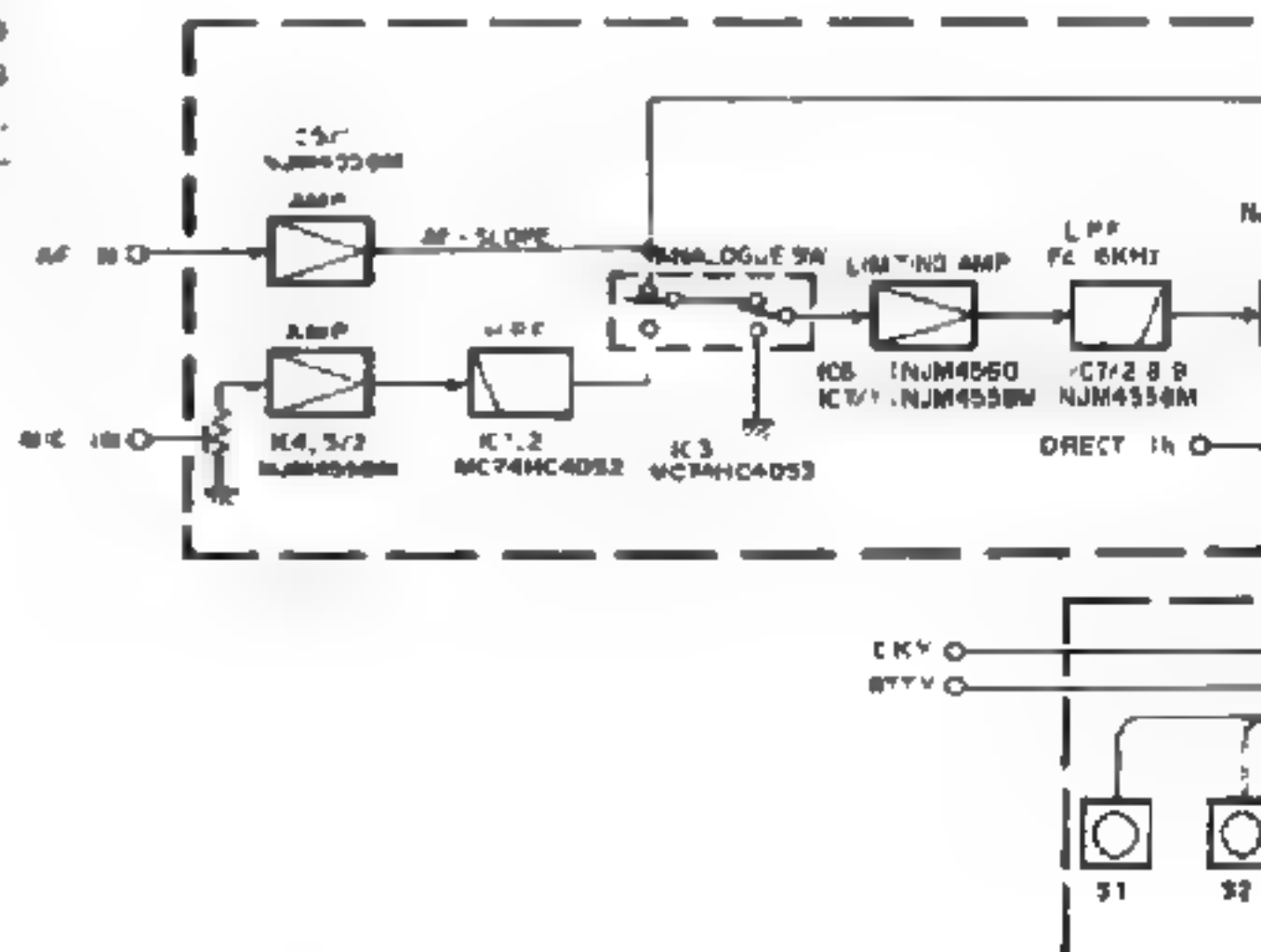
Excellent characteristics are obtained through digital form-restoration of the wave shape.

3) AM mode

Low-distortion modulated waves with excellent amplitude and group delay characteristics are obtained through digital modulation and by using the 94th FIR filter.

4) FM mode

Provides the high-quality 455 kHz carrier. DSP-10 does not provide modulation.



CIRCUIT DESCRIPTION

5) FSK mode

Excellent, low-distortion modulated waves are obtained through FSK modulation with continuous phasing after the digital form-restoration of the rising form and characteristic of the waveform.

6) SSB mode (received)

AF slope tuning is provided by the digital filter, to suit the slope of the transceiver.

DSP Unit

• Outline and configuration

The DSP-10 is provided to digitally process transmitter signals in the SSB, CW, AM, and FSK modes, and it is also used to provide AF-slope tuning in the SSB receive mode.

Figure 38 is a block diagram of the DSP-10. The DSP-10 consists of a digital unit, which performs digital signal processing, an analog unit, which processes analog signals and sends them to the digital unit, and converts the input from the digital unit back to analog signals; and a PLL unit, which generates clock pulses for managing the frequencies in the main unit, and performing digital signal processing with an accurate sampling frequency.

1) Modulation

The MIC audio signal is applied to an input buffer where the low-frequency components are eliminated by a high-pass filter, composed of IC1 and IC2 (MC74HC4052F), which is used to limit the bandwidth of the signal. The output of the high-pass filter is routed through limiting amplifier IC3 (NJM4560M) and C7/1 (NJM4558M) to limit the input amplitude before the signal is applied to the A/D converter. Components of the signal outside the Nyquist band are eliminated by a low-pass filter consisting of IC7/2, IC8, and IC9 (NJM4558M). The resulting signal is converted into a Pulse Coded Modulated (PCM) waveform by the sample and hold amplifier circuit consisting of IC10, IC11 (NJM0728M), and Q1 (2SK508) and is then applied to the A/D converter IC12 (PCV78AP). The signal is then converted into a digital signal with a sampling frequency of 49.189 kHz by IC12 (PCV78AP). In the SSB and AM modes, the resulting digital signal is used as the modulating signal.

The leading and trailing edges of the shift data from CW keying and RTTY are checked by the DSP. When the edge of the waveform is detected, data regarding the square-wave characteristics is read sequentially from the ROM. This data is used to either modulate the amplitude or frequency.

Note: 49.189 means 49.189189189... (recurring decimal).

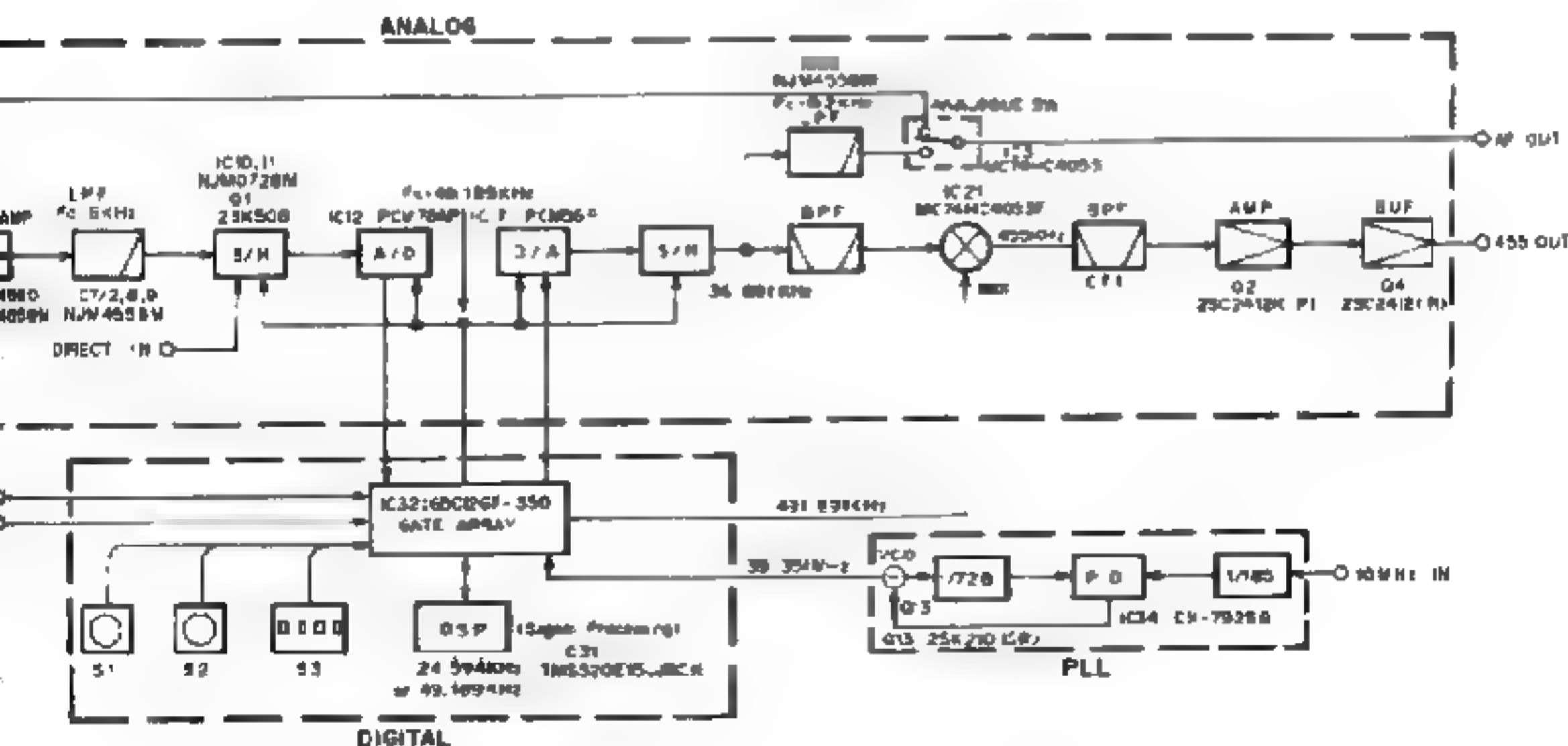


Fig. 38 DSP unit block diagram

CIRCUIT DESCRIPTION

The modulated waveform that has been digitally processed and supplied by the D/A converter IC*7 (PCV567) has a modulation spectrum rich in odd order harmonics that are 1/4 the sampling frequency ($1/4$, $3/4$, $5/4$, etc). A frequency of 36.891 kHz, which is $3/4$ the sampling frequency, is taken by the bandpass filter and is mixed with a frequency of 491.891 kHz by IC21 (MC74HC4053F) in order to generate a signal of 455 kHz. The unwanted adjacent components of this signal are eliminated by ceramic filter CF1, amplified by Q2 (2SC2412K), and output from buffer amplifier Q4 (2SC2412K). In the CW and AM modes, the output level is reduced in order to match the level of the meter unit.

Figure 39 shows the frequency spectrum of the MIC input, A/D input, D/A output, 36.891-kHz bandpass filter output, and 455-kHz output.

Item	Rating
Nominal center frequency (f ₀)	455kHz
3dB bandwidth	±5 kHz or more from 455kHz
6dB bandwidth	±7.5kHz or more from 455kHz
70dB bandwidth	±12.5kHz or less from 455kHz
Guaranteed attenuation	80dB or more at 455±100kHz 60dB or more at 0.1 to 1 MHz
Ripple	3dB or less at 455±5.0kHz 6dB or less at 455±7.5kHz
Insertion loss	6dB or less
Voltage capacity (between pins)	50V DC 1000pF max.
Input and output impedance	1.6kΩ

Table 11 Ceramic filter (L72-0375-05) (DSP unit CF1)

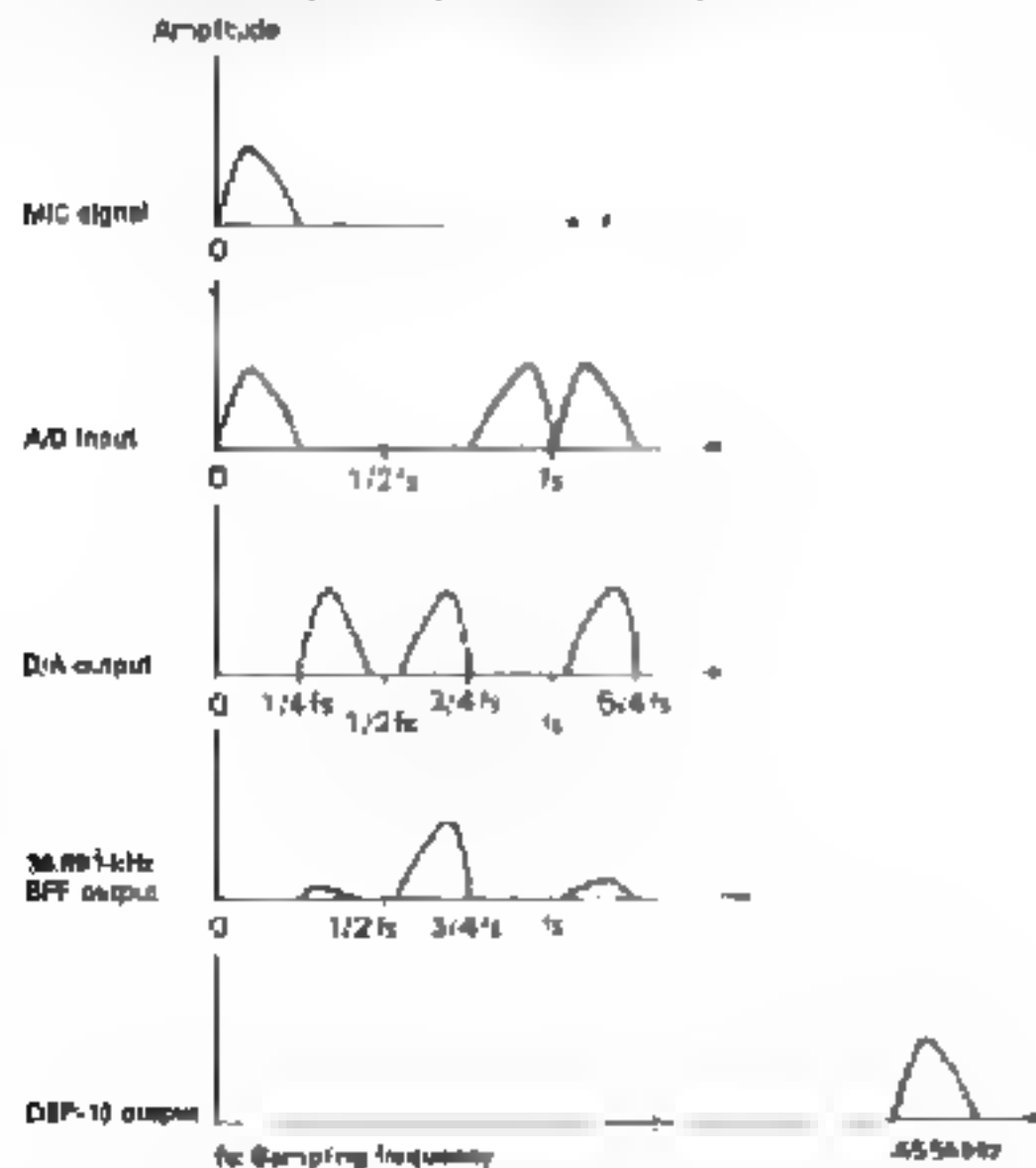


Fig. 39 Frequency spectrum in SSB mode

AF SLOPE TUNE

The audio signal supplied from the input buffer amplifier IC5/1 (NJM4558M), like the MIC signal, is passed through the limiting amplifier in order to limit the level of the signal applied to the A/D converter. The signal then passes through the low-pass filter. This signal is then converted into a Pulse Code Modulated waveform by the sample and hold amplifier circuit before it is applied to the A/D converter. The signal is converted to a digital signal with a sampling frequency of 49.189 kHz by the A/D converter. Further processing of the signal is accomplished in the Digital unit. This signal is then applied to the D/A Converter IC*7 where the now processed audio is obtained.

The PCM signal from the D/A converter is passed through low-pass filter C20 (NJM4558M) to eliminate undesirable harmonics and smooth the signal. Its level is equalized with the input level, switched by analog switch IC3 (MC74HC4053F), and applied to the AF CUT terminals.

Figure 40 shows the frequency characteristics of the audio input, low-pass filter output, A/D input, D/A output, and resulting audio output.

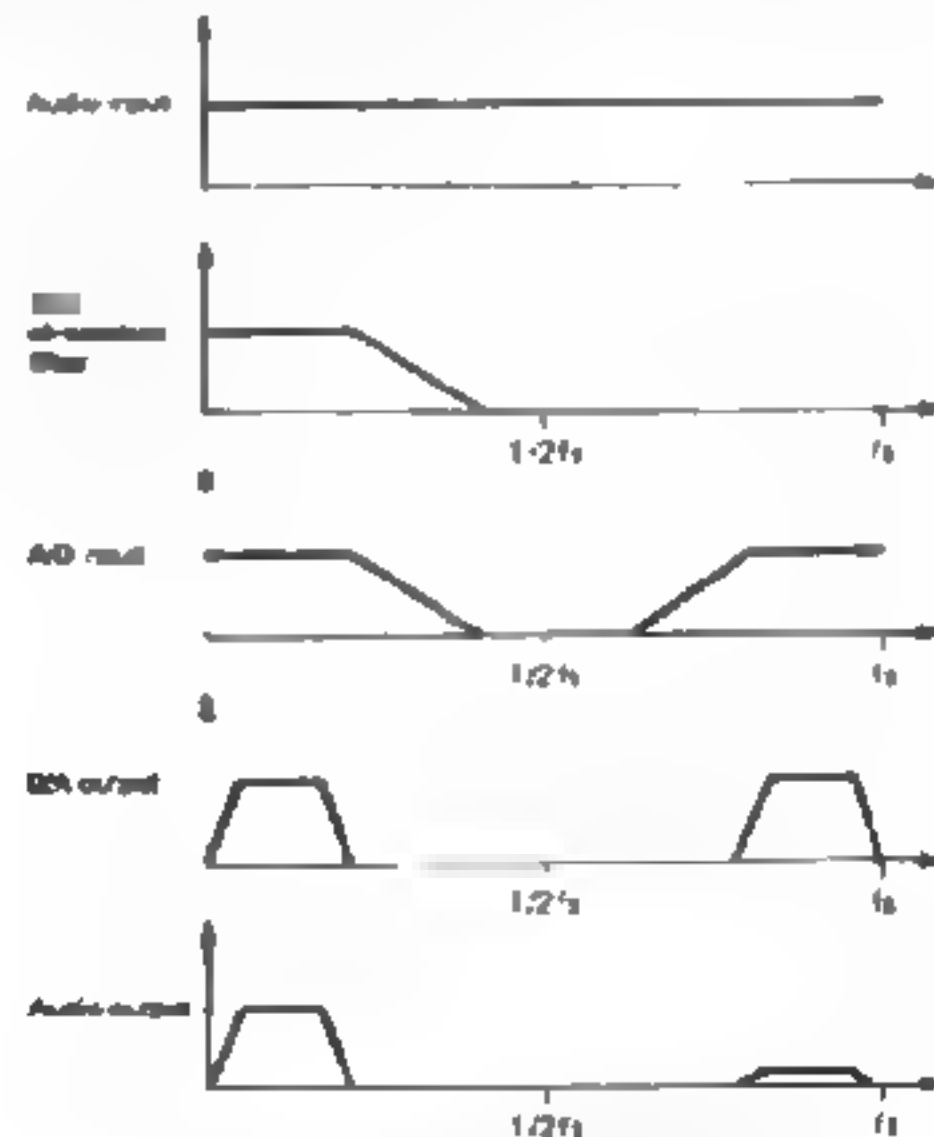


Fig. 40 Frequency characteristics of AF SLOPE TUNE

CIRCUIT DESCRIPTION

3) Frequencies

The DSP-10 reference signal of 10 MHz (1/2 the reference oscillator signal of 20 MHz) is multiplied by 728/185 in the DSP PLL unit. This signal is applied to gate array IC32 (μ PD65012GF-350) of the digital unit as the 39.351-MHz internal reference signal.

The gate array divides the signal by 1/800 to generate a sampling clock of 49.189 kHz, and again divides the signal by 1/80 to generate a 491.891 kHz clock signal that is used for mixing.

The frequency of the harmonic free signal supplied by the D/A converter is 38.891 kHz, which is 3/4 the sampling frequency. The 455-kHz IF output is produced by taking the difference between this frequency and the 491.891 kHz mixing frequency.

• PLL unit

The PLL circuit is a relatively conventional PLL circuit that is used to obtain a fixed reference frequency that is used for each clock circuit used in the DSP unit.

The Phase Detector of the PLL circuit is IC34 (CX-7925B). The incoming reference frequency of 10 MHz is amplified by amplifier Q12 and applied to pin 5 of IC34. Here the signal is divided by 1/185 in order to generate a comparison frequency of 54.064 kHz. The output from the VCO passes through buffer amplifier Q14, and is applied to pin 11 of IC34. Here it is divided by 1/728, and compared with the 54.064 kHz reference signal in order to lock the VCO.

Division ratio data is sent from the main unit via the digital unit on the DMA2, DC<2, and DLE2 lines. The PLL output is supplied to the digital unit via buffer amplifier Q15 where it is used as an internal reference.

$$\begin{aligned} f_{\text{DSPSTD}} &= 728/185 \times 1/2 f_{\text{STD}} = 728/185 \times 10 \times 10^6 \\ f_{\text{MX}} &= f_{\text{DSPSTD}}/80 \quad f_s = f_{\text{DSPSTD}}/800 \\ f_{455} &= f_{\text{MX}} - 3/4 f_s \\ &= 37/3200 f_{\text{DSPSTD}} = 37/3200 \times 1456/37 \times 10^6 \end{aligned}$$

• Digital unit

The digital unit consists of DSP IC31 (TMS320E15), gate array IC32 (μ PD65012GF-350), write signal control IC36 (MM74HC00N), reset IC33 (S-8054ALR-1N), and amplifier Q16 (2SC2714), which amplifies the internal reference to the necessary level before it is applied to the gate array.

1) DSP

A 25-MHz crystal oscillator signal is used for the DSP internal clock circuits. The DSP operates on a clock signal of 6.25-MHz (160 ns) which is 1/4 the crystal oscillator frequency.

Data is transferred between the A/D and D/A converters and signals are received from the main unit via the gate array.

2) Write signal control

Since it is possible that the DSP address data may become invalidated before the falling of control signals WE, MEN, and DEN, the WE control signal is gated by the DCCLK line to prevent malfunctions of the gate array.

3) Internal reference signal amplifier

The internal reference signal from the PLL is amplified to approximately 3.6 Vp-p, raised to the appropriate DC bias level, and applied to the CLK line of the gate array.

4) Switches

S1, S2, and S3 are recognized by the DSP only when the mode is changed normally (i.e., when commands are received from the main unit). They are recognized only when the system is reset in the test mode. Therefore, changes in the settings of these switches do not become void by just changing the switch settings. The only exception is the high-pass filter in the analog unit; it is controlled directly by S1.

5) Gate array

The gate array generates internal/external clock signals from the internal reference provided by the PLL; interfaces with the analog unit; generates the DSP reset signal, receives commands from the main unit to the DSP and input switches S1, S2, and S3.

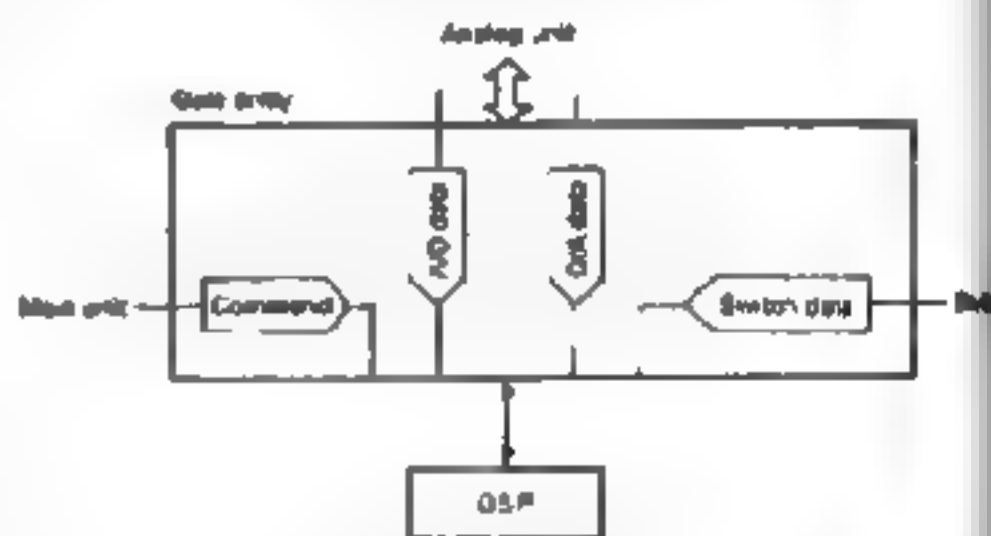


Fig. 41 Data flow in the digital unit

Reception of commands from the main unit

When MEN (MLE) is low, the MDA (SD) data is read into the internal shift register synchronized with the leading edge of the MCK (ISC) signal. Data is latched in the internal buffer register by reading the 16-bit data and making MEN (MLE) high, which generates an interrupt (N \bar{N}) to the DSP. The output from MDA is synchronized with the leading edge of the DCCLK signal from the DSP.

CIRCUIT DESCRIPTION

• Reset

The leading edge of the reset signal applied to the $\overline{\text{NRS}}$ line from IC33 is delayed by the signal that is obtained by dividing the internal reference signal and is then applied to the $\overline{\text{NRES}}$ line.

The negative pulse to the $\overline{\text{NMR}}$ line is also delayed by the signal that is obtained by dividing the internal reference signal and is then applied to the $\overline{\text{NRES}}$ line.

The delay time in both cases is approximately 1.3 nsec.

• BIO signal

The pulse that is synchronized with the sampling frequency, f_s , is output to the BIO so that it is synchronized with the leading edge of the DCLK signal from the DSP.

The BIO signal output from the gate array is applied to the BIO line of the DSP. The DSP performs processing for each sample in synchronization with the BIO line.

• Analog data and interface

*6-bit serial data read from the A/D converter ADT, CK17 CC

*6-bit serial data written to the D/A converter DADT, CK17 LEC

Data sample timing for sample hold amplifier SH

Timing for output duty variable circuit A\SW

For ADT, CK17, CC, DADT, CK17, LEC, SH, and A\SW, the timing is synchronized with the sampling period and is generated by the gate array.

The mixing clock (MX) is turned off during AF-SLOPE operations.

MODE	MDO0	MDO1	MDO2
SSB	0	1	0
CW	1	1	0
AM	1	1	0
FM	0	1	0
FSK	0	1	0
AF SLOPE	0	0	0
RX other than SSB	0	1	0

Table 12 IC2, Q3 control (MDO0 to MDO2)

Cut-off	HPF1	HPF2
10	1	1
200	1	0
300	0	1
400	0	0

Table 13 HPF cut-off change (HPF1, 2)

Terminal		Function	Terminal		Function
Name	I/O		Name	I/O	
DBA-DBF	I/O	Data bus	MX00	0	Low-pass filter input mixing
A2-A2A11	I	Address bus	SD*0		High-pass filter setting LS3
WE	I	Write signal	SD*1		High-pass filter setting LS3
RDEN	I	Read signal	SD*2		Low-pass filter setting LS3
VMEH	I	Memory recall	SD*3	1	Low-pass filter setting LS3
BIO	C	Sampling timing	SD*4	1	CW leading edge characteristics
DCLK	I	DSP timing clock	SD*5	1	SSB ripple characteristics
NINT	C	DSP interrupt	SD*6	1	AF slope wide/narrow
NRES	C	DSP reset	SD*7	1	SF extension
NRS	I	Gate array reset	SD*8	1	Test (TPS)
MX	C	Clock for converting the D/A output to 455 MHz	SD*9	1	TGB
SH	0	Sample and hold amplifier sampling timing	KEY	1	CKV
LEC	C	D/A converter command	SFT	1	RTV
ADT	0	Data from A/D converter	SD	1	Serial data for commands
CK17	C	Serial transmission clock	ISC	1	Serial clock for commands
CC	0	A/D converter command	EN	1	Command data enable
DADT	0	Data to D/A converter	N/R	1	Manual reset input
A\SW	0	D/A output duty variable	CLK	1	Reference clock input
MDO0	0	DMIC-CAF1 change, CAF1-CAF2 through	N*5	1	For test
MDO1	0	ATT control	N*52		

Table 14 Functions of gate array terminals

CIRCUIT DESCRIPTION



Fig. 42 Timing chart for gate array

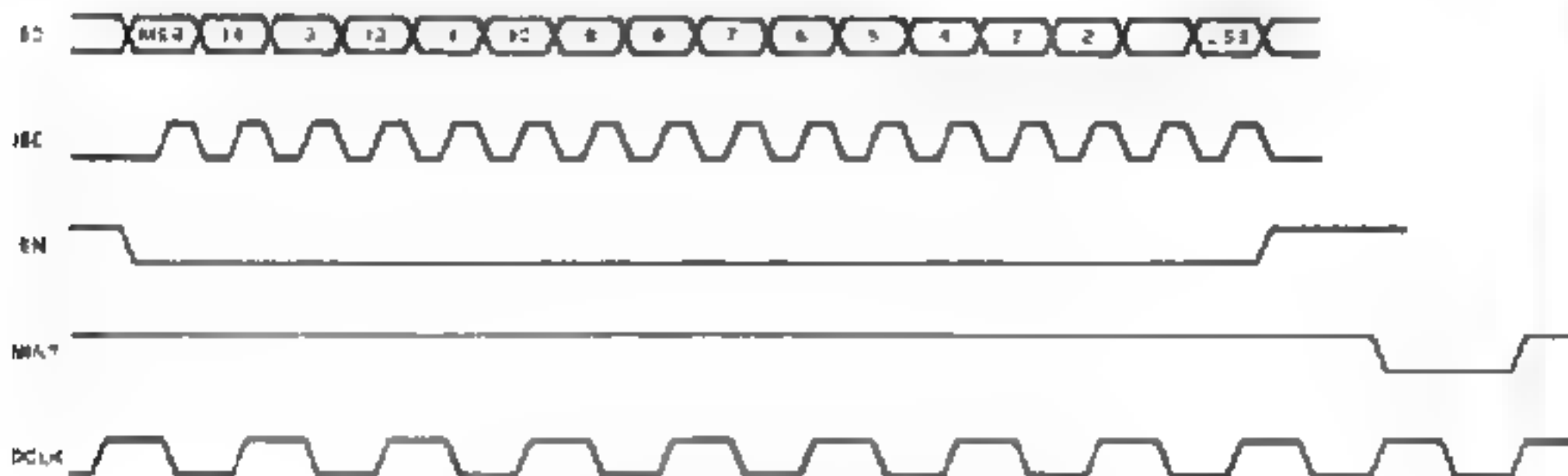


Fig. 43 Serial data entry and interrupt generation

CIRCUIT DESCRIPTION

• Analog unit

1) High-pass filter IC1, IC2 (MC74HC4052F)

The high-pass filter used for modulation processing is not a digital filter, but an analog filter because of the processing ability of the DSP. This high-pass filter allows the operator to program up to 4 different cut-off frequencies in order to select the desired tone.

S1	HPF1	HPF2	Y	X	Cut-off frequency (-3dB)
0, 4, 8	1		Y3	X3	75Hz
1, 5, 9	1	0	Y2	X2	185Hz
2, 6	0	1	Y	X1	300Hz
3, 7	0	0	Y0	X0	400Hz

• MIC input high-pass filter

The active high-pass filter is configured as a fourth-order Butterworth filter and is controlled in four steps by IC1 and IC2.

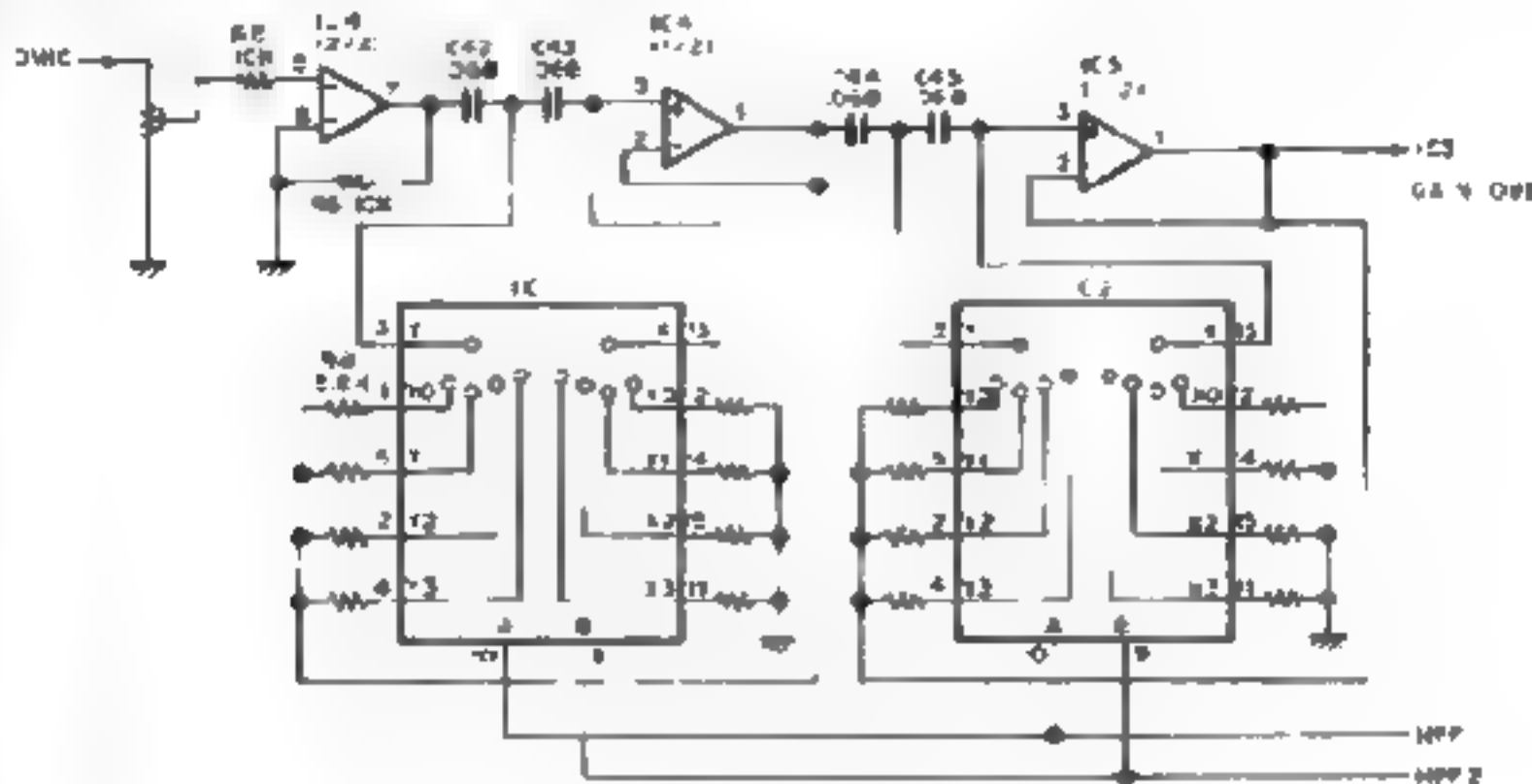


Fig. 44 MIC input high-pass filter

2) Limiting amplifier

IC6 (NJM4560M), IC7/1 (NJM4558M)

When a signal with too much amplitude is applied to the A/D converter, it is possible to experience large levels of distortion. To prevent this, the amplitude of the incoming signal is clipped by up to 3.2 Vp-p by a limiting amplifier to ensure that the level applied to the A/D converter (IC12 pin 1) does not exceed 6 Vp-p (full scale).

When the output amplitude is between the spec-

ified limits (as illustrated in the accompanying diagram) the limiting amplifier operates as a 20-dB amplifier.

When the amplitude exceeds these limits, D2/1 turns on. When the amplitude exceeds V_{c-} , D2/2 turns on to clip the amplitude so that the output amplitude is between V_{c+} and V_{c-} .

The shapes of the signal peaks become irregular because of the delay of the operational amplifier (IC6) and diodes (D2), but this poses no problem.

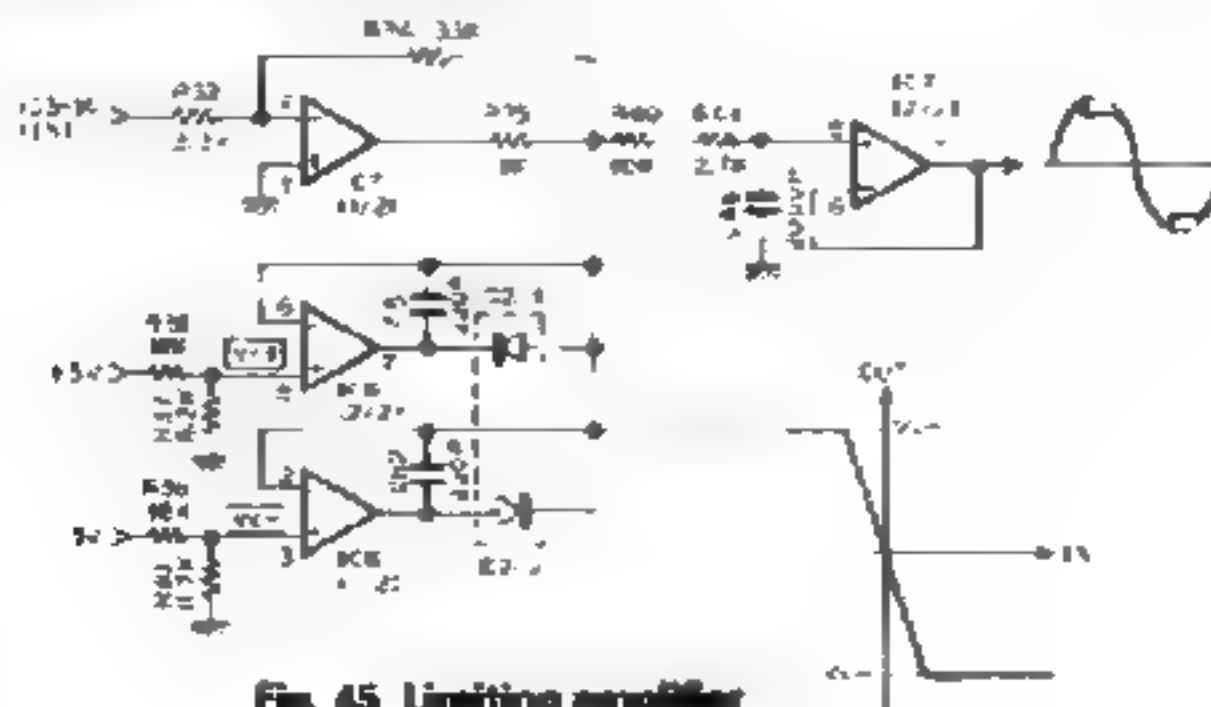


Fig. 45 Limiting amplifier

CIRCUIT DESCRIPTION

3) Sample and Hold

This is an integration type A/D converter that samples analog signals and keeps the input level of the A/D converter constant during the conversion process.

When 0 V is applied to the gate of Q1, Q1 turns on charging C53. When a negative voltage is applied to the gate of Q1, Q1 turns off the voltage during sampling is maintained at a constant level.

If Q1 is always on, the amplifier operates as an inverting amplifier whose gain is determined by R53 and R58. The gain is 0 dB.

R69 and R70 are protection resistors for IC13(1) and IC14(1).

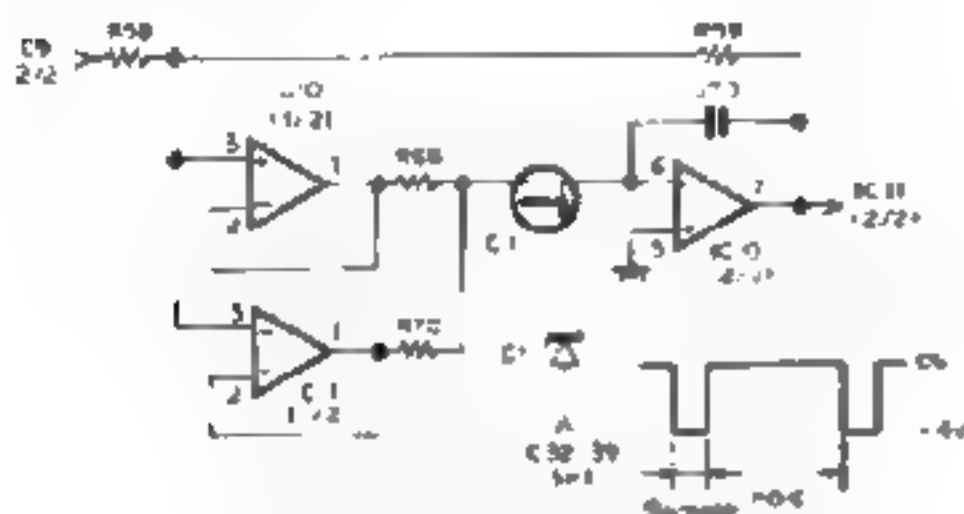


Fig. 46 Sample and hold circuit

4) LPF

This LPF is an sixth degree active Butterworth filter. This filter eliminates folded distortion and prevents signal-to-noise ratio reduction and distortion caused by the entry of unwanted signal components into the A/D converter.

5) D/A converter circuit

The D/A converter output is converted to the wedge type with a 50% duty during processing. The D/A converter output is distributed directly during AF-SLOPE operations. The frequency characteristics (aperture effect or early roll-off) of the D/A converter output are improved by taking the output with a 50% duty during processing.

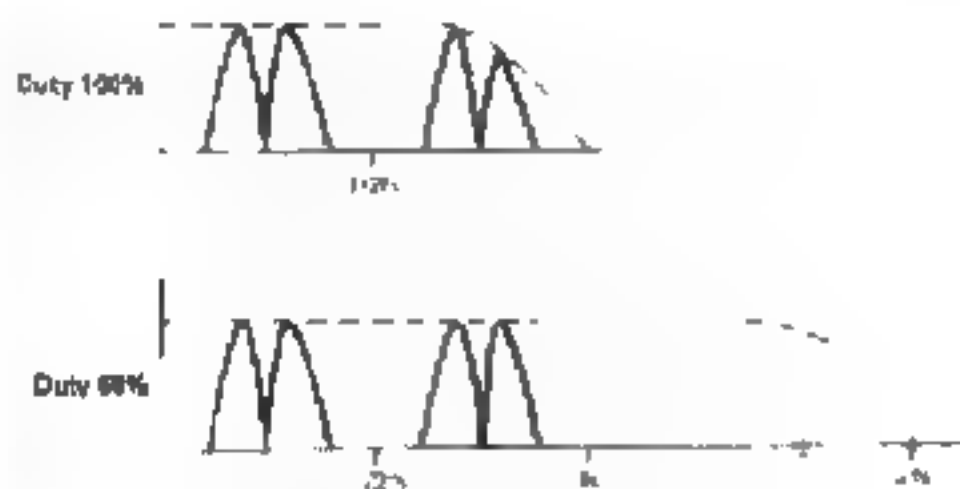


Fig. 47 Aperture effect

6) D/A output sampling circuit

Turns the D/A output on and off with the analog switch.

Turns the output on and off with a 50% duty during transmission in the SS3, CW, AM, and FM modes. Always on during AF-SLOPE TUNE. IC19 eliminates the analog switch output, and operates as a buffer amplifier.

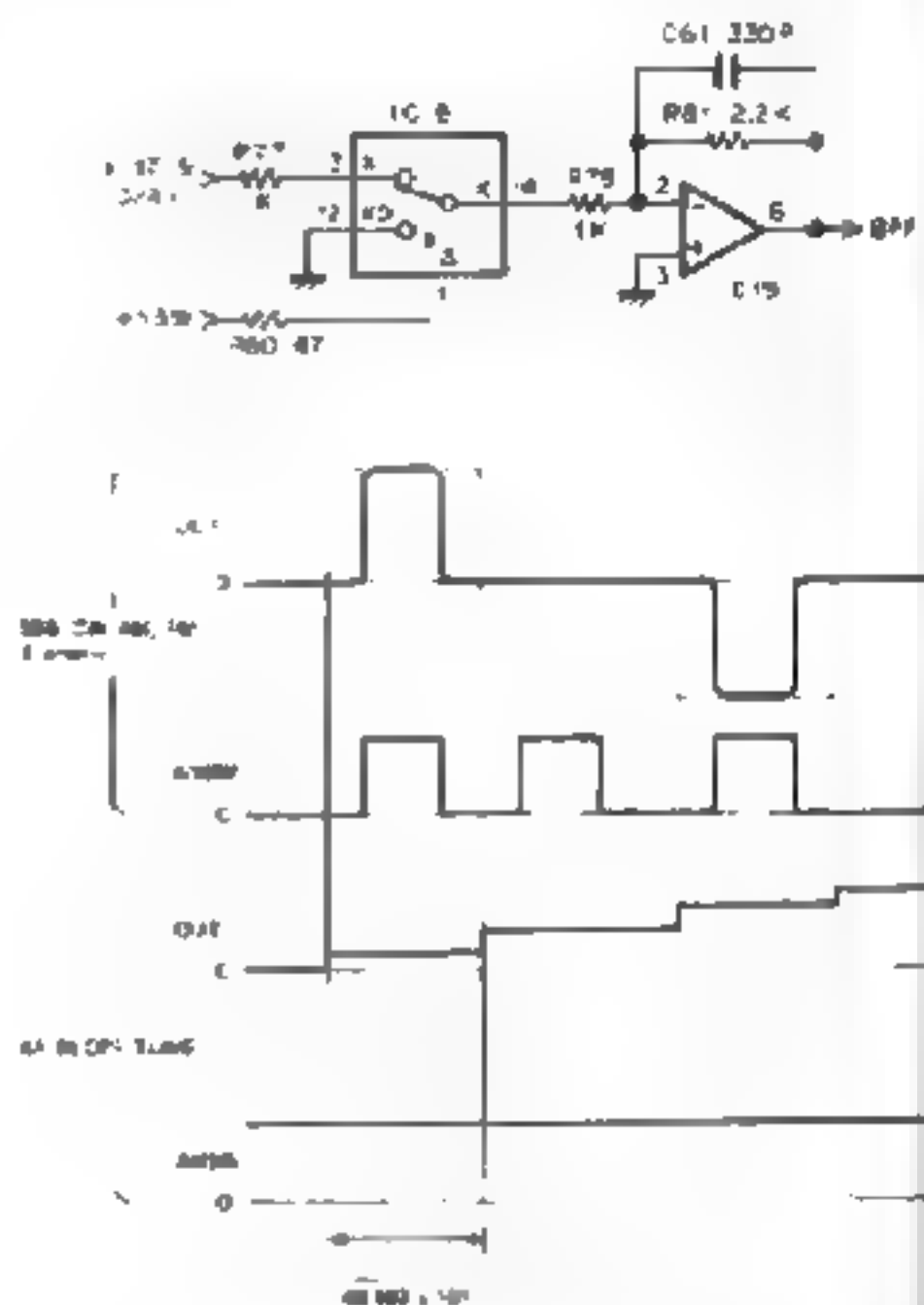


Fig. 48 D/A output sampling circuit

7) ATT

Turns on Q3 in the CW and AM modes, forming a voltage divider circuit on the output of Q2 that is composed of R96 and R97 to reduce the signal level applied to Q4.

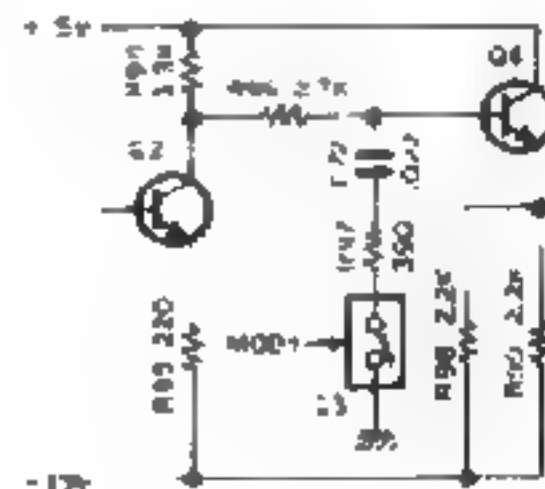


Fig. 49 ATT

CIRCUIT DESCRIPTION

Mixer

Combines the 36.891 kHz signal with the 491.891 kHz signal to produce the 455 kHz output. Q5 is an input buffer. Q6, an output buffer.

Since this mixer is used to combine square waves, it generates many harmonics of 491.891 kHz, but it does have the desirable characteristic of producing less distortion and noise than IC type mixers.



Fig. 50 Mixer

Description of digital signal processing

The DSP-10 converts the analog signal to a digital signal to implement modulation and filtering by numerical means rather than using conventional IC circuits and analog ICs.

Since the modulation and filtering performed by the DSP-10 do not suffer from the inaccuracies of conventional analog processing methods, it is possible to provide ideal properties.

The DSP-10 uses a sampling frequency of 491.891 kHz for the A/D and D/A converters. When it is preferable to use a lower sampling frequency to reduce the processing time and improve performance, the sampling frequency is reduced by 1/2 or 1/4.

1) SSB modulation**Overview of processing**

Several different methods are available for digitally processing an SSB signal; they include the direct modulation method, the Weaver method, and the Hartley method. The DSP-10 uses the direct modulation method.

There are two generally accepted direct modulation methods: the filter method which removes the unnecessary sideband thru the use of an analog filter, or the method that suppresses the unnecessary sideband by generating a copy of the incoming audio signal that has had its phase shifted by 90 degrees thru the use of a phase shift network (PSN) and adding it with the orig-

inal signal and carrier. Since the second method results in an SSB signal that has been obtained thru the use of phase shifts, the use of a filter with steep cutoff characteristics, such as the ones used in the filter method, is not required. Therefore a higher sideband suppression ratio can be obtained from the low-frequency range using this broadband phase shifter. This method is far superior to the filter method in obtaining a wide frequency response. In the past this method has not been used much because it has been difficult to obtain a PSN (Phase Shift Network) with good characteristics due to variations in parts tolerances, circuit stability, and errors in circuit adjustment.

The DSP-10 uses the PSN method to generate SSB with good characteristics thru the use of an accurate, stable phase shifter obtained by digital signal processing.

The modulated signal from the A/D converter is applied to a LPF to limit the bandwidth. The signal is then split and applied to the Phase shift network where the phase of the two signals is shifted by 90 degrees. The resulting signals, with a phase difference of 90 degrees, are mixed with carrier signals that are also 90 degrees out of phase with each other. The two resulting signals are then subtractively mixed to produce the SSB signal. The carrier of the SSB modulated wave is suppressed thru the use of a digitally controlled comb type filter and then exits the D/A converter.

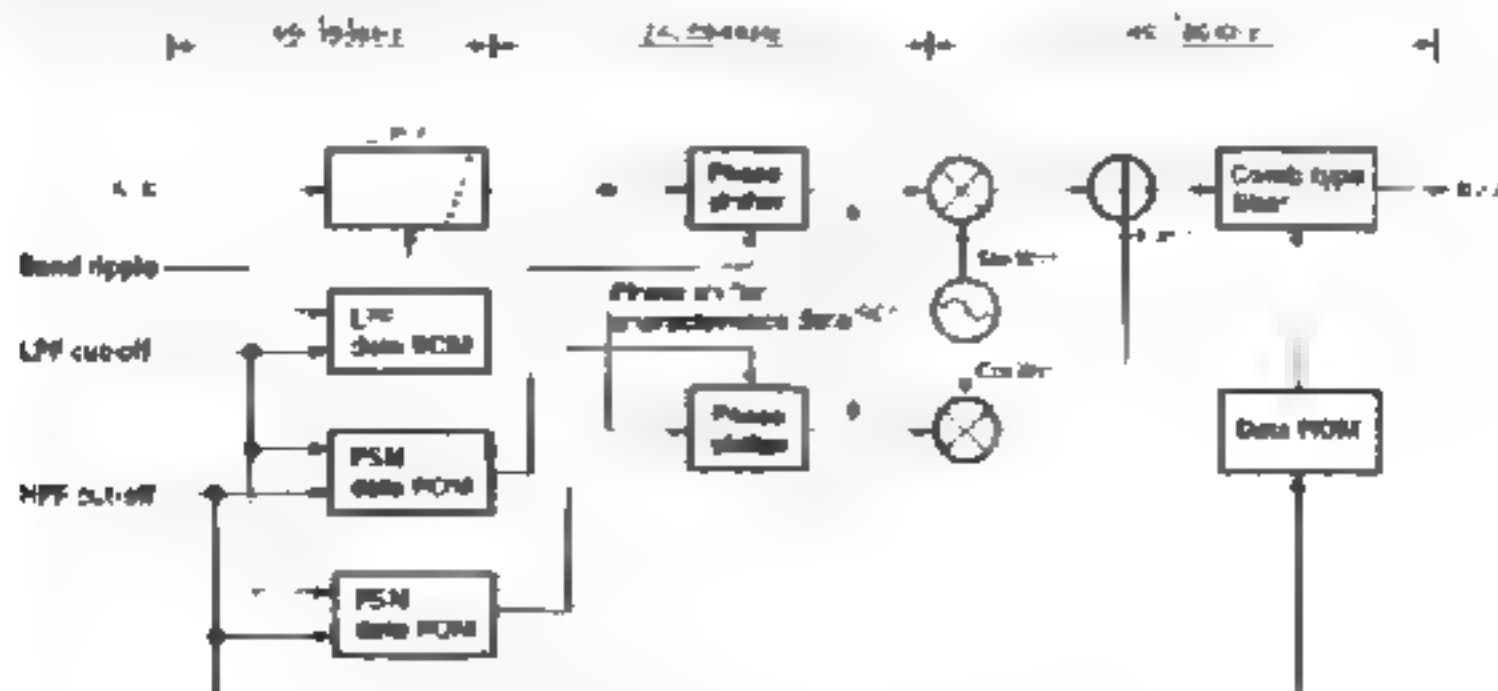


Fig. 51 SSB modulation block diagram

CIRCUIT DESCRIPTION

Functions

The LPF is a 5th order programmable Chebyshev design. It allows the cut-off frequencies to be changed in four steps and the ripple in the band to be selected between 0.01 dB and 1.6 dB. When the ripple is set for 0.01 dB, the group delay characteristics are primary, i.e., the sound quality is considered to be the most important. When the ripple is set for 1.6 dB, the transition band characteristics are primary, i.e., the band width is considered to be the most important.

The DSP-10 uses two 5th order phase shifters, each consisting of five all-range passing-type phase shifters connected vertically to obtain sideband suppression characteristics of 70 dB or more. To further improve the sideband suppression characteristics, the degree of phase shift is increased or the 90-degree bandwidth of the phase shifter is narrowed.

Increasing the degree of the phase shifter is not desirable because the group delay characteristics deteriorate and faster processing is required. The DSP-10 implements the optimum characteristics for each transmit band by changing the design band ratio and frequency of the phase shifter by a combination of a high-pass filter and a low-pass filter.

Table 15 lists the various of high-pass filters and low-pass filters combinations which are selected to improve the sideband suppression ratio when the bandwidth is narrow.

Theoretically, there is no carrier leakage by the digital multiplier. However, it does occur due to the offset voltage that is generated by the noise produced in the processing of the phase shifter. To prevent this, the DSP-10 uses a digital comb-type filter to suppress carriers. Whenever MIC input is present, this filter makes the carrier leakage below measurable levels.

The cut-off of the high-pass filter for suppressing the leakage on the opposite sideband of the phase shifter is the overall cut-off of the analog high-pass filter and comb-type filter.

HPF	LPF	Phase shifter band
110	2600, 2750	80-242E ±270dB
	2900, 3100	75-420E ±270dB
200	2600, 2750	125-369E ±274dB
	2900, 3100	75-429E ±270dB
300	2600, 2750	180-647E ±274dB
	2900, 3100	
400	2600, 2750	225-852E ±274dB
	2900, 3100	

The bandwidth of the phase shifter are those before quantization, and therefore do not exactly match the actual bandwidth.

Table 15

2) CW

The 455-kHz carrier is generated or stopped according to the data supplied by the keying device. The DSP detects the leading edge (KEY down) and trailing edge (KEY up) of the keying signal, reads data from the internal square cosine characteristics ROM, modulates the amplitude according to the data, and obtains the shaped CW output.

A filter with square/cosine characteristics is used to shape the waveform for data communication. The filter has the advantage that it reduces the question at a status (0 or 1) at the data change point caused by overshooting of waveforms, and decreases the bandwidth caused by data change.

It is difficult for an analog filter with these characteristics to name equivalent amplitude characteristics, and it must have linear phase. Therefore, it can have only approximate characteristics. In addition, this filter is very complicated. The DSP-10 provides good transmit waveforms, in which even steep CW waveforms have no KEY clicks, without having to resort to the use of analog filters.

When the CW spectrum of the DSP-10 is viewed with a spectrum analyzer, the spectrum is concentrated at the carrier. Since the transmission bandwidth is narrow, there is less influence even when the receiver passes signals through a narrow-band filter than before.

The CW leading edge characteristic is normally 2 msec. The operator can select from several values between 2 msec and 4 msec.

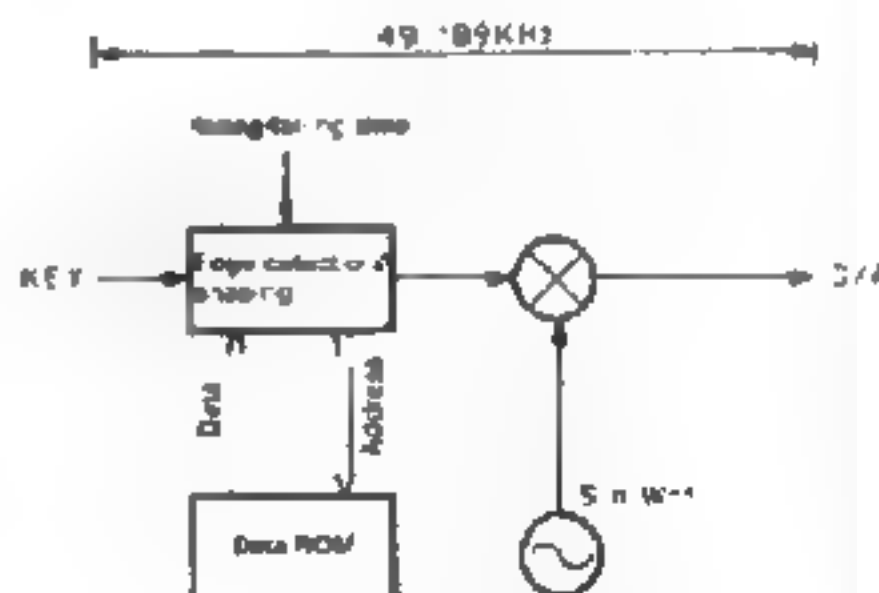


Fig. 52 CW block diagram

CIRCUIT DESCRIPTION

31 AM

The bandwidth of the modulating signal from the A/D converter is limited by the low-pass filter, given a specific offset, and is multiplied by the carrier to produce the modulated AM signal.

The low-pass filter is an Finite Impulse Response (FIR) digital filter of the 84th degree, which provides good frequency characteristics and flat group delay characteristics. Additionally, since linear modulation processing is performed with a digital multiplier, modulated waves with little distortion are obtained up to levels of 100% modulation.

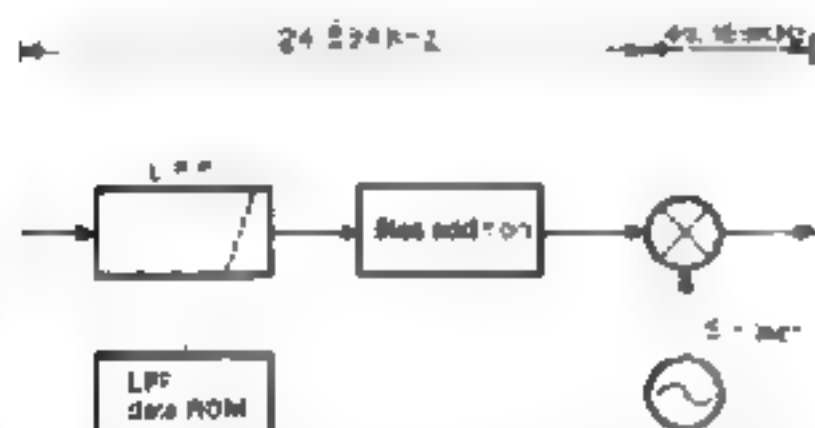


Fig. 53 AM modulation block diagram

4 FSK

The mark and space frequencies are generated directly by digital signal processing according to the frequency shift data from the RTTY line (DPS).

The DSP detects the leading and trailing edges of the shift signal. The DSP reads the data from the internal square cosine characteristics ROM and obtains the shaped FSK as the DDS frequency data. The mark frequency does not greatly interfere with the space frequency because of the square cosine waveform shaping characteristics, as in the CW mode, and because FSK modulation is performed with continuous phases. There is therefore, less character change or bit errors when modulating the signal.

Strictly speaking, the actual shift widths is not 170 200, 425, and 850, but 171 129, 201 152 426 322, and 849 642 due to the frequency steps that can be generated by the DSP. This should not prove to be of any practical concern.

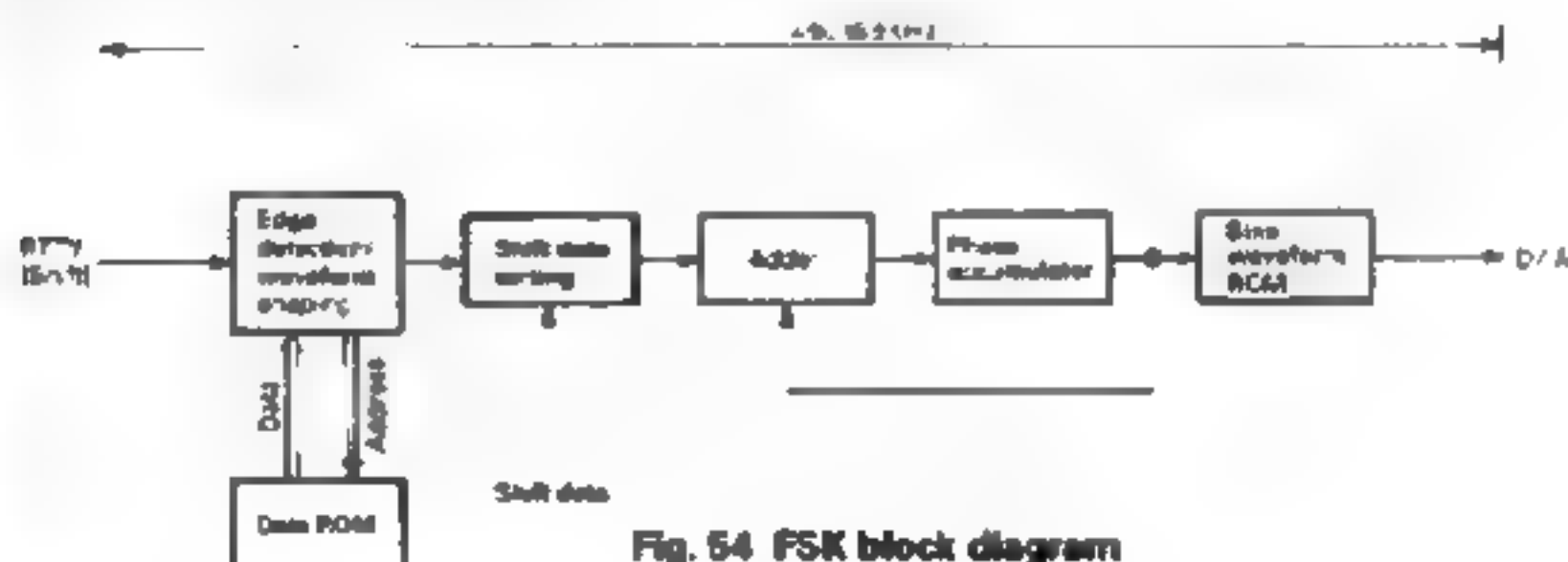


Fig. 54 FSK block diagram

S A SLOPE TUNE

Interlocked with the SS3-SLOPE TUNE control of the main unit, this functions as the A2-SLOPE TUNE for the audio band.

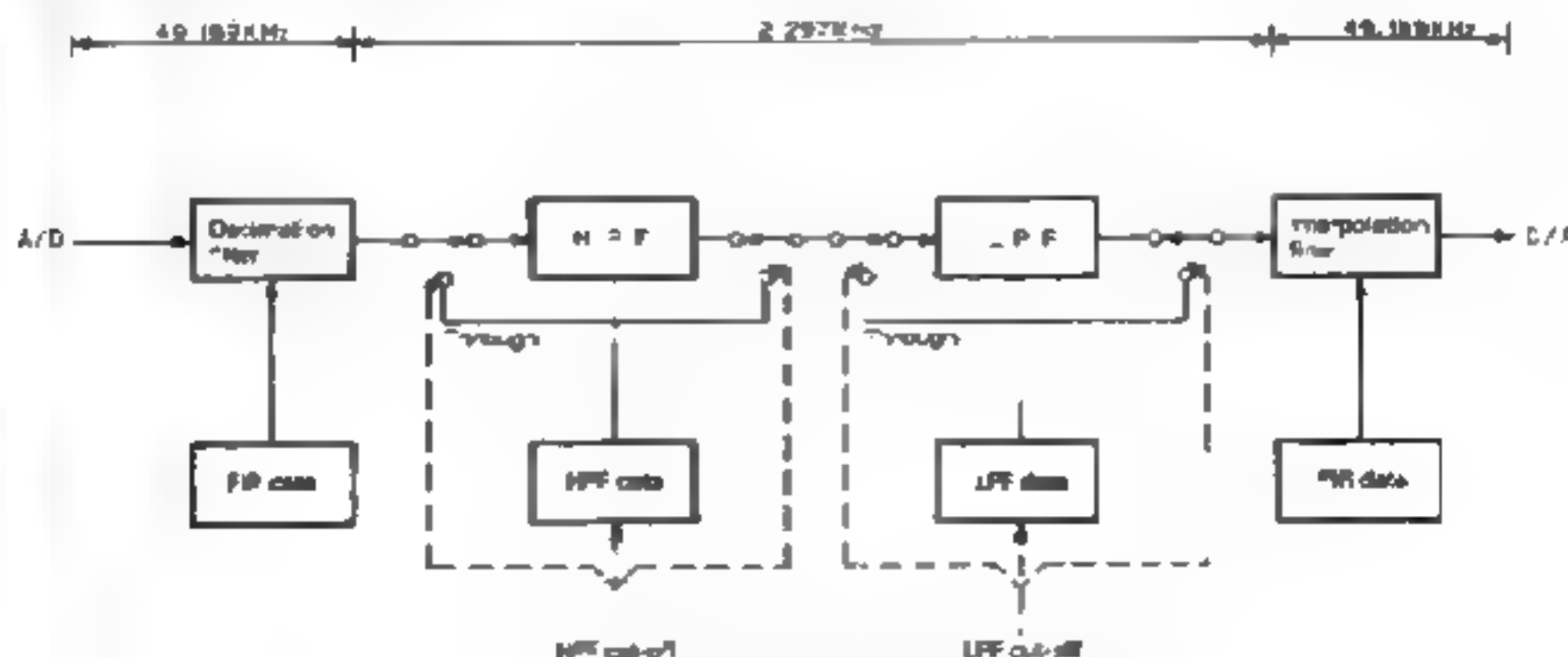


FIG. 55 AF SLOPE TUNE block diagram

CIRCUIT DESCRIPTION

Overview of processing

The digital audio signal from the A/D converter is converted into 1/4 the sampling frequency by the decimation filter, and is then processed by the high-pass and low-pass filters. The signal is then returned to the original sampling frequency by the interpolation filter, and transmitted from the D/A converter.

Functions

The decimation filter and interpolation filter are composed of 20th degree FIR filters.

The high-pass filter is a simultaneous 4th order Chebyshev filter. The low-pass filter is a simultaneous 6th order Chebyshev filter.

The ripple bandwidth of the high-pass filter is 0.1 dB, and that of the low-pass filter is 0.0001 dB. These characteristics assure flat frequency characteristics and reduce variations in the group delay characteristics near the cut-off frequency.

The sampling frequencies for the high-pass filter and low-pass filter are reduced by 1/4 to shorten the processing time. This helps provide ample processing time for both the high-pass filter and low-pass filter and improves performance.

The cut-off frequencies of the high-pass filter and low-pass filter are controlled according to data from the main unit, and operate interlocked with the slope tune controls of the main unit. The bandwidth can be narrowed by two clicks with the SLOPE TUNE control on the main unit by operating the DSP-10 switch.

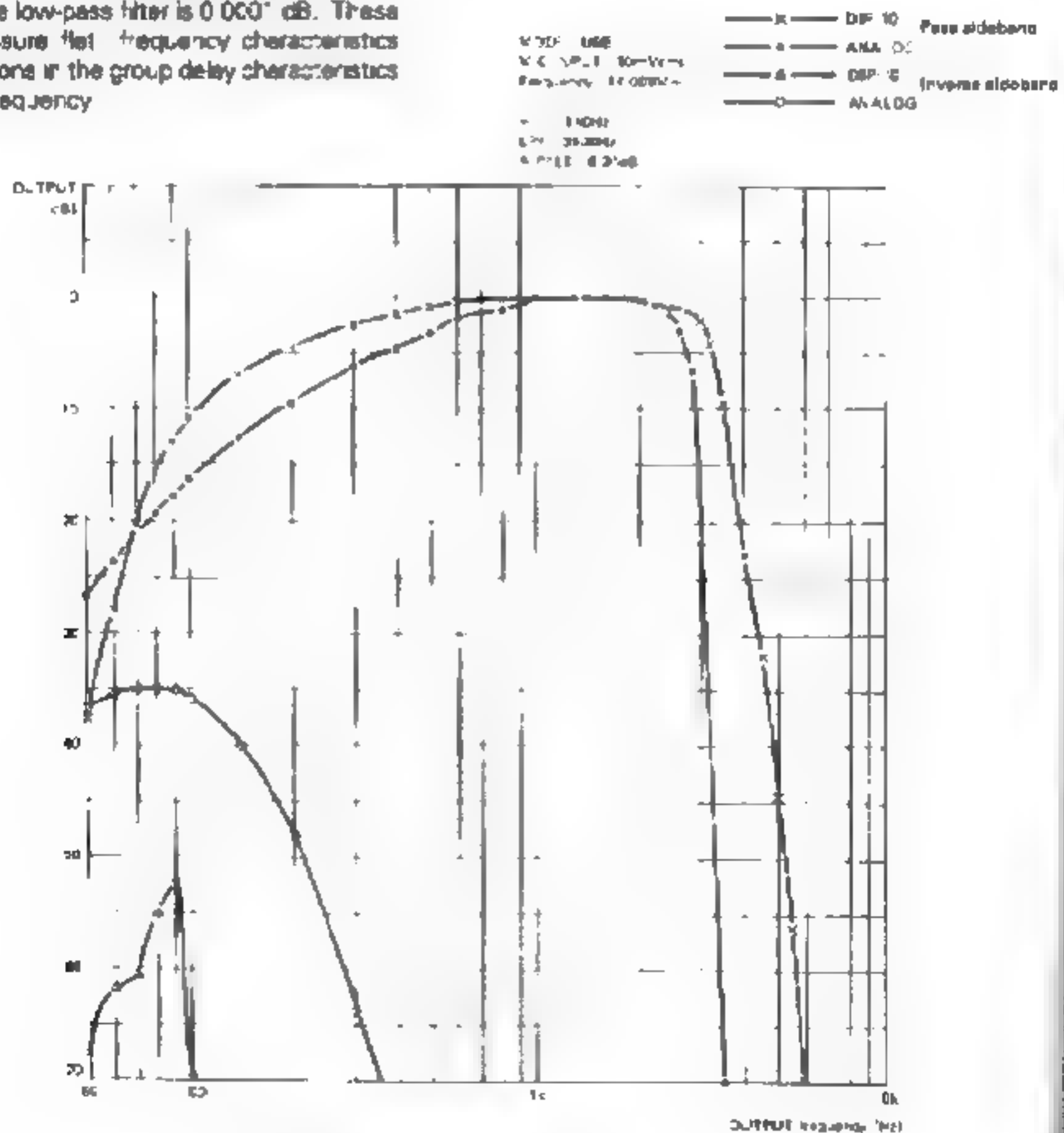


Fig. 56 TS-950SD SSB frequency response

CIRCUIT DESCRIPTION

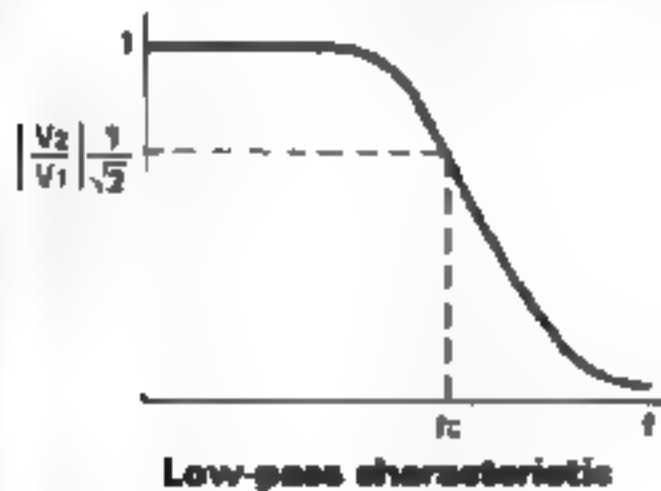
Reference data

1) Butterworth characteristic

The ratio of input voltage V_1 and output voltage V_2 is given by the equation (1).

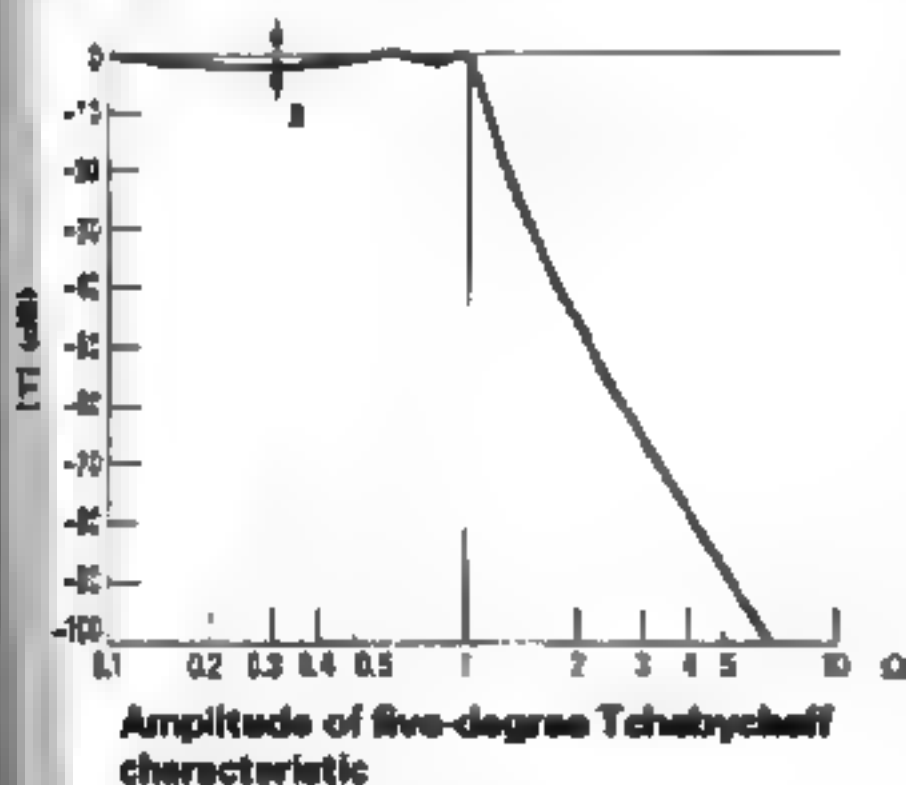
$$\left| \frac{V_2}{V_1} \right| = \frac{1}{\sqrt{1 + (f/f_c)^{2n}}} \quad (1)$$

V_2/V_1 becomes (1) when $f < f_c$ and decreases when $f > f_c$. As the figure below shows, this functions as a low-pass filter with f_c as a border. This is called the Butterworth characteristic and is representative of 4th order characteristics. The f_c is called a cutoff frequency.



2) Chebyshev characteristic

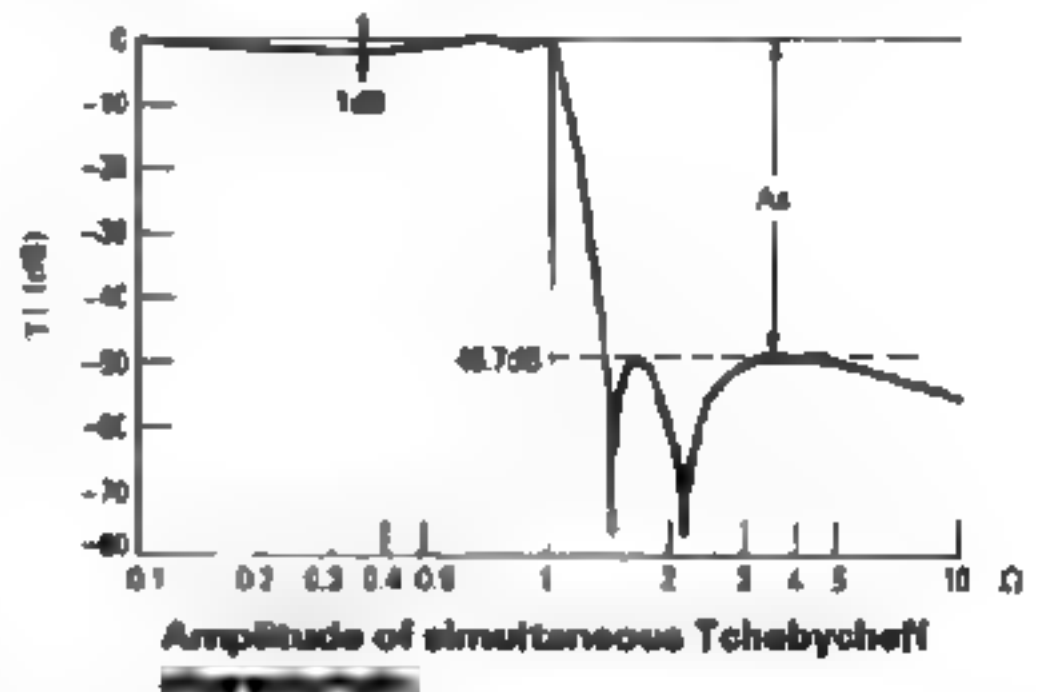
A Butterworth characteristic has a flat response in the passband, but can have a sharp cutoff when the passband contains ripple. A characteristic that contains an equal ripple in the passband is called a Chebyshev characteristic. The maximum cutoff can be obtained with respect to the ripple in the given passband. The amplitude of a five-degree Chebyshev characteristic having 1 dB of ripple in the band is shown in the figure below.



3) Simultaneous Chebyshev characteristic

All amplitudes of the characteristics described above decrease when attenuation decreases. At that time, the transfer function is represented by the reciprocal of a polynomial expression. When the numerator of

the transfer function is also represented by a polynomial expression and transmission zero points are set to some attenuation bands, an even sharper cutoff can be obtained. A characteristic that contains equal ripple in the passband and attenuation band is called a simultaneous Chebyshev characteristic. The sharpest cutoff characteristic can be obtained with respect to the given degree, allowable ripple in the passband, and minimum attenuation in the attenuation band. The five-degree amplitude characteristic when the ripple in the passband is 1 dB and minimum attenuation, as in the attenuation band is approximately 50 dB as shown below.



4) Nyquist band

When a signal is sampled using sampling frequency f_s in accordance with the sampling theorem, sampled signal $f(t)$ can be reproduced by interpolating a sampled signal if its band is $1/2 f_s$. A band of $1/2 f_s$ is called the Nyquist band.

5) Transition band characteristic

This indicates the situation in which the band transitions from passband to stopband.

6) Elliptic (Cauer) filter

This is suitable for manufacturing a filter having a sharp cutoff. This filter can be designed by converting the transfer function of an analog filter.

7) FIR filter

This filter has a perfectly linear phase, stable operation, and improved signal-to-noise ratio (SNR).

8) Decimation filter

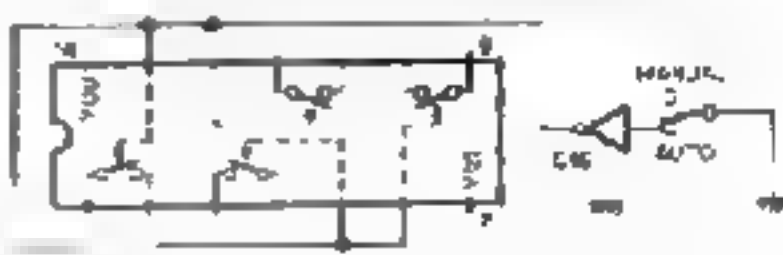
This filter is used to decimate data when a signal is converted to a low sampling frequency.

9) Interpolation filter

This filter is used to interpolate data when a signal is converted to a high sampling frequency.

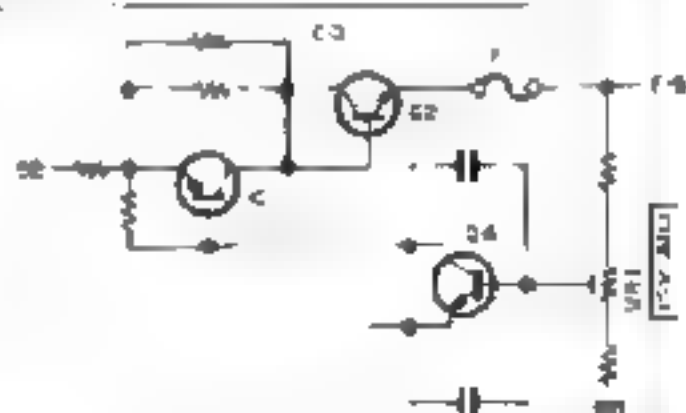
DESCRIPTION OF COMPONENTS

SWITCH UNIT (A) (X41-3000-00)

Components	Use/Function	Operation/Condition/Compatibility
IC1	AT AUTO/MANU signal select	
IC2	One shot timer delay vibrator	For dimmer and etc.
Q1	FM LED driver	LFM ICMB Active "H"
Q2	AM LED driver	LAM ICMB Active "H"
Q3	CW LED driver	LCW ICMB Active "H"
Q4	USB LED driver	LUSB ICMB Active "H"
Q5	LSB LED driver	LUSB ICMB Active "H"
Q6	FSK LED driver	FSK ICMB Active "H"
Q7	TA LED driver	TA ICMB Active "H"
Q8	RM LED driver	RM ICMB Active "H"
Q9	RA LED driver	RA ICMB Active "H"
Q10	TM LED driver	TM ICMB Active "H"
Q11	TS LED driver	TS ICMB Active "H"
Q12	RS LED driver	RS ICMB Active "H"
Q13-15	Key pad LED driver	LC1 ICMB Active "H"
Q16	Driver	Analog gate IC11 select
Q17	Buffer	
D1-7	Reverse current prevention	
D8	AIR LED	HPC ICMB Active "H"
D9	NOTCH LED	LNCT ICMB Active "H"
D10	AT TUNE LED	MTA ICMB Active "H"
D11	ON AIR LED	TXB ICMB Active "H"
D12	DB protection	D12 gate to reverse bias when +PC become "H"
D13	AVR	+10V
D14	Reverse current prevention	


AVR UNIT (X43-3070-01) (A/B) ~ (E/G)

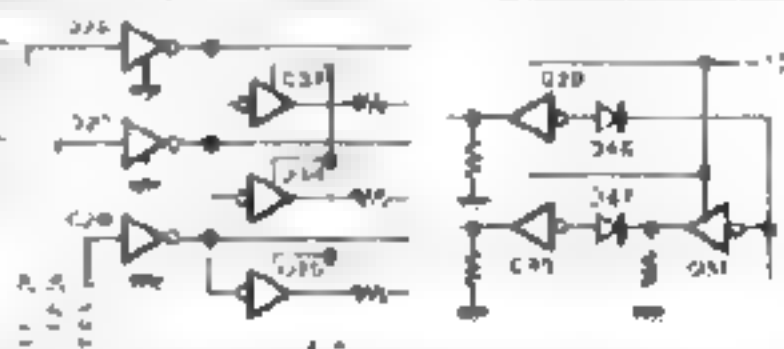
Components	Use/Function	Operation/Condition/Compatibility
IC1	+8V AVR	+8V voltage supply for logic unit
IC2	+3V AVR	+5V voltage supply for PLL unit
IC3	+5V AVR	+5V voltage supply for DSP unit
IC4	-12V AVR	-12V voltage supply for each PC board
Q1	Pre drive	Drive to Q2 device
Q2	Series-passed transistor	+5V voltage supply for each PC board
Q3	Fan motor "H GH" switch	Fan motor turned to "H GH" position
Q4	An error amplifier	Amplified voltage error of the +10V voltage supply
Q5	-40V AVR	-40V voltage supply for FL tube
D1	Voltage rectifier	Base bias for Q1
D2	Temperature compensation	Cancel to D1 voltage change from temperature changing
D3	+3.3V AVR reference voltage	+7.5V
D4	Fan turned start voltage	Monitor voltage when the fan turned on
D5	Voltage rectifier	-40V
D6	Voltage rectifier	-12V
D7-8	Occur -40V voltage	-30V ± 2
D9	Voltage rectifier	-50V voltage for final unit
D10	Voltage rectifier	+15V



DESCRIPTION OF COMPONENTS

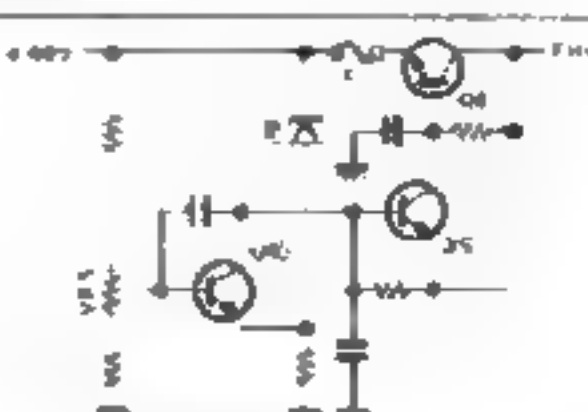

RF UNIT (X44-3100-00)

Component	Use/Function	Operation/Condition/Compatibility
IC1,2	Band information decoder	Open collector Active 1"
Q1-3	RF AGC amplifier	
Q4	AIF amplifier	
Q5,5	RF amplifier	
Q7	Buffer	
Q8-11	RX SUB 1st mixer	Convert receive frequency into 40.055MHz
Q12	Buffer	
Q13-15	RX MAIN 1st mixer	Convert receive frequency into 73.05MHz
Q17	SUB VCO amplifier	
Q18	MAIN VCO amplifier	
Q19	TX DRIVE amplifier	RF output of RF unit 10-20 dB max
Q20,21	TX 3rd mixer	Convert 73.05MHz into transmission frequency
Q22	TX amplifier	
Q23	Switching	When F33 become F* output to L*
Q24	Switching	On in MONITOR operation
Q25	Switching	On in AT TUNE
Q26-28	Switching	Transmission F select
Q29-31	Switching	AF turned on and off select
Q32	Switching	On in MONITOR operation
Q33-35	Switching	Band of TX and RX select
Q37	Switching	AT in MONITOR operation
D1,2	Relay surge voltage absorber	D1 100Ω ATT D2 200Ω ATT
D3	Voltage regulator	Voltage supply of IC1 and IC2 15V
D4,5	Lightning surge protector	
D6-35	RX BPF select	
D36	Switching	MAFKEY circuit switch
D37,38	AF AGC	AGC circuit code
D39	Switching	Frequency range 2.5 MHz less and more select
D40	Voltage shift	
D4	Voltage regulator	
D42-45	Switching	AIF connection and off select
D46,47	Reverse current prevention	
D48,49	Switching	MONITOR turned on and off
OSC,51	Switching	MAIN VCO transmission and receive select
Q52-57	Switching	TX BPF select
J58-60	Reverse current prevention	TX mixer circuit bias
28	Reverse current prevention	Decide to put of the POWER CONTROL or AT TUNE
289	Reverse current prevention	
289	Lightning surge protection	
284	Switching	MAFKEY circuit switch

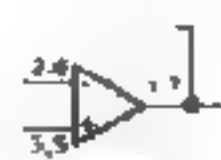


DESCRIPTION OF COMPONENTS

FINAL UNIT (X45-3330-00)

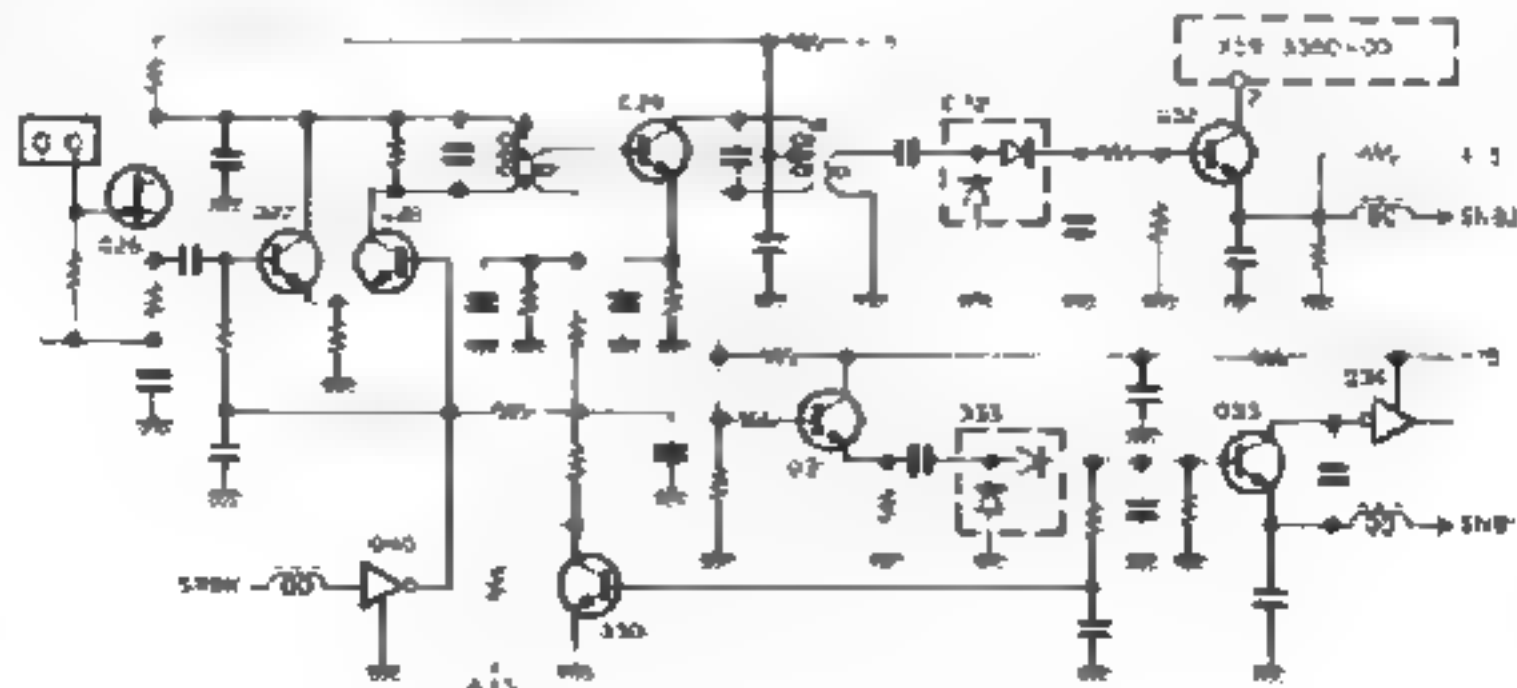
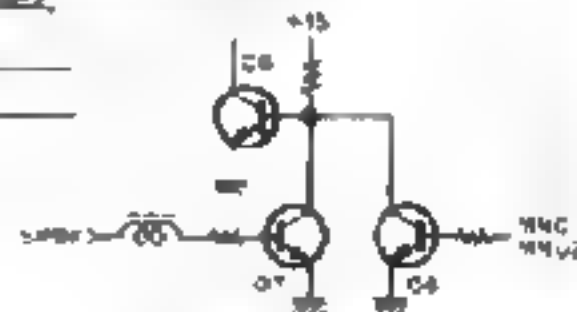
Components	Use/Function	Operation/Condition/Compatibility
Q1	Pre-drive amplifier	HF wide range amplifier
Q2,3	Driver amplifier	Pumpul wide range amplifier
Q4,5	Final amplifier	Pumpul wide range amplifier
Q6	Drive bias voltage supply	
Q7	Final bias voltage supply	
Q8-10	AVR	Final +42V
		
Q11-13	Switching	Fast recovery diodes
Q14,15	Switching	Transistor stop when regular voltage of 50V
		
D1	Temperature compensation	Pre-driver temperature detector
D2	Temperature compensation	Drive temperature detection
D3	Temperature compensation	Final temperature detector
D4	16V voltage detection	
D5,6	Reverse current prevention	
D7	Switching	Transistor stop when temp. or voltage or 50V
D8	AVR	50V AVR reference voltage
D9	Surge absorption	For let motor
D10	AVR	Voltage drop detection when S1 switch turned on

DIGITAL UNIT (X46-3060-XX) -11: K.P -21: M -01: W -02: W2 -71: X

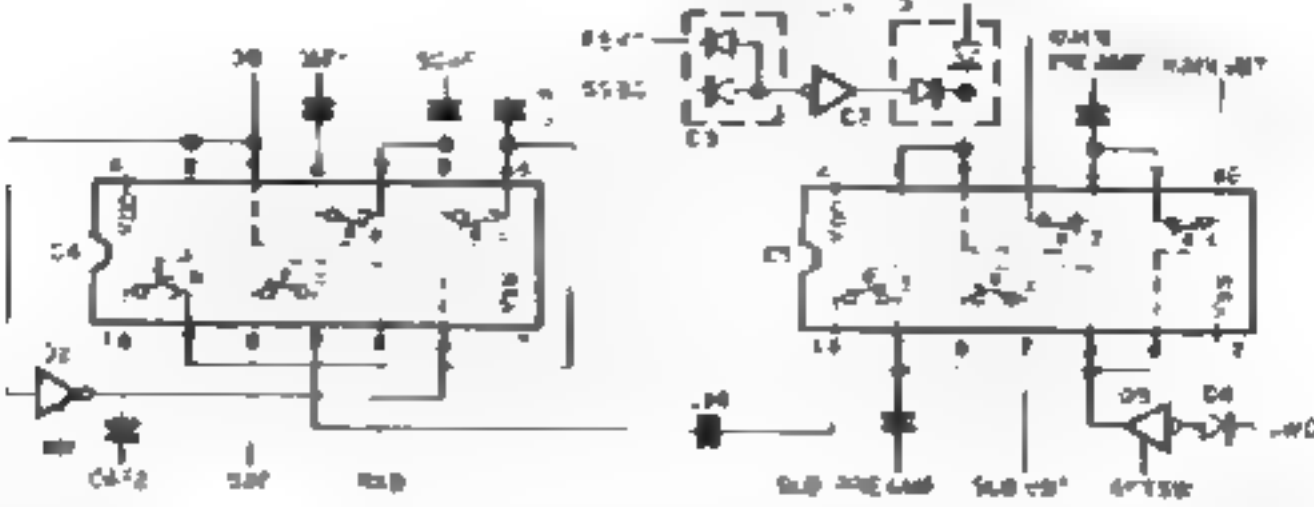
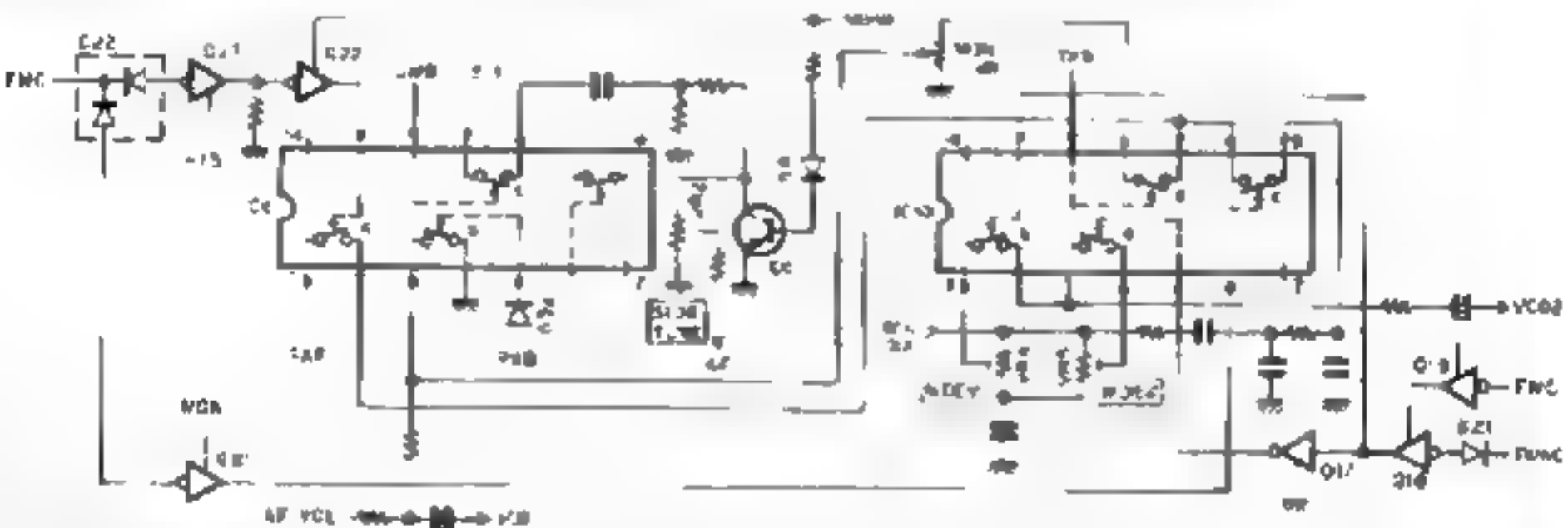
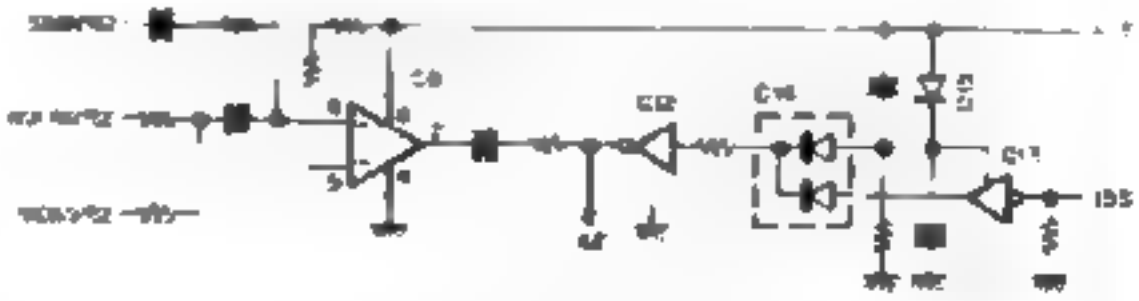
Components	Use/Function	Operation/Condition/Compatibility
IC1	CPU	8 bit microprocessor
IC2	ROM	32K x 8 bit
IC3	RAM	2K x 8 bit
IC4	Address latch	Multi-decoder address/address latch of data output
IC5	Address decoder	Convert address signal into each IC chip select signal
IC6	I/O port	8 bit x 4 4 bit x 1
IC7	I/O port	8 bit x 8
IC8	I/O port	8 bit x 4 4 bit x 1
IC9	Encoder gate array	MAIN, CL, CK count of the encoder
IC10	Encoder gate array	SUB, RT, OT count of the encoder
IC11	Buffer	D/A converter output
		
IC12	Inverter	Encoder square wave circuit
IC13	A/D converter	8 bit 8 channel

DESCRIPTION OF COMPONENTS

Components	Use/Function	Operation/Condition/Compatibility
Q5	SUB IF amplifier NB gate	10.655MHz
Q6	Switching	Turned on when MAIN and SUB NB1, NB2, and SUBK pulse occur
Q7	Switching	Turned on when SUBK pulse occur
Q8	Switching	Turned on when MAIN and SUB NB1, NB2 pulse occur
Q9-10	SUB IF amplifier	10.655MHz
Q11	Buffer	10.605MHz AGC
Q12	SUB AGC amplifier	
Q13	SUB 2nd local amplifier	60.75MHz
Q14	MAIN IF amplifier	73.05MHz
Q15,16	MAIN 2nd mixer	73.05MHz \rightarrow 8.83MHz
Q17,18	Switching	Turned on when SUBK pulse occur
Q19-20	MAIN 3rd mixer	8.83MHz \rightarrow 4.53MHz
Q21	Switching	Turned off when VAG2 and SUB NB2 pulse occur
Q22	Switching	Turned on when VAG2 and SUB NB2 pulse occur
Q23	Buffer	73.05MHz for F.C.U.1
Q24	Mixer	73.05MHz \rightarrow 8.83MHz for F.C.U.1
Q25	Amplifier	84.22MHz
Q26	Buffer	10.605MHz for SUB NB3
Q27-29	Amplifier	10.605MHz for SUB NB3
Q30	AGC amplifier	SUB NB
Q31	Buffer	SUB NB
Q32	Switching	SUB NB2
Q33,34	Switching	SUB NB



DESCRIPTION OF COMPONENTS

Components	Use/Function	Operation/Condition/Compatibility
IC5 (a/4)	AF select switch	On in C/A AF VST operation (when MAIN are using AF VST).
IC5 (d/4)	AF select switch	On in C/A AF VST operation (when SUB are using AF VST).
		
IC6 (a/4)	Sidestone ON and OFF switch	On in C/A mode.
IC6 (c/4)	Monitor AF short switch	Receive mode or MONITOR search is turned off. Short.
IC6 (c/4)	AF select switch	On without FM mode (AF for monitor without FM mode).
IC6 (d/4)		Unused.
		
IC7 (a/2)	AF amplifier	MAIN AF
IC7 (b/2)	AF amplifier	SUB AF
IC8 (a/2)	AF amplifier	MAIN SUB and MONITOR mixing
IC8 (b/2)		Unused.
		
IC9	One shot multivibrator	Make a VCO delay time 2: CD (Input) 4: A (Input) GND 5: B (Input) 6: Q (Output)
IC10 (a/4)	FM MIC amplifier output select switch	On in FM MONITOR mode
IC10 (b/4)	FM MIC amplifier output select switch	On in FM NARROW mode
IC10 (c/4)	AF select switch	On in FM MONITOR mode (A- for -A monitor).
IC10 (d/4)	AF select switch	On in transmit mode (A- for -A monitor).
IC11	PLL (MAIN, O1) 150kHz step 30MHz coverage	2,3,4: Divided ratio setting input 5: 10MHz input 7: LOCK voltage output 8: UNLOCK output when unlocked "H" 9: 38-88MHz input
IC12	Mixer (MIX1)	5: 73.05-103.05MHz input 11: 35.05-35.55MHz input 13: 35-65MHz output

DESCRIPTION OF COMPONENTS

Components	Use/Function	Operation/Condition/Compatibility
IC13	PLL1 MAIN OSC	2 3.4 Divisor and setting input 5 10MHz input 7 LOCK voltage output 5 LINE/LOCK output, when selected '4' '2' B0 22MHz input
IC14	AVR	10V 5-line AF unit
IC15	AVR	12V 5-line AF unit
C1	AFT amplifier	30kHz - 50kHz
C2	Switching	On when YSP installed
C3	Switching	On in FSK or SSB mode
C4	Switching	On in AF VBT operation
C5	Switching	On in Ctx mode
C6	Muting	On when no station output
C7	Muting	On when insert a city plug into jack
C8	Muting	On in transmit MABK and SQ mode 3/A N mode
C9	Muting	On in transmit SABK and SQ mode SUB mode
C10	AF amplifier	WABK B-C D J
C11	AF amplifier	SUB B-C D J
C12	Muting	When power switch is turned on or off, mute in TX/RX
C13	Switching	On for reset when power switch is turned on
C14	Switching	On in Ctx and FSK mode
C15	AF amplifier	for sub tone
C16	Muting	On in receive mode 3/A mode in FM HIC line when receive mode
C17, B	Switching	On in FM NAB BCT mode
C18	Switching	On in FM mode
C19	AF amplifier	FM V-C signal
C20	Switching	On in FM mode
C21	Switching	On in FM mode
C22	Switching	On in FM mode
C23	Switching	On in FM mode
C24	Switching	VCO select 11.0kHz-7.5MHz on
C25	Switching	VCO select 17.5MHz-14.5MHz on
C26	Switching	VCO select 14.5MHz-21.5MHz on
C27	Switching	VCO select 21.5MHz-30MHz on
C28	Switching	LINE/LOCK detector (P1, D1)
C29-31	PLL1 low-pass filter	Active filter Reference frequency 50kHz
C32	VCO output amplifier	73 35MHz-103.5MHz
C33	M/D input buffer	73 35-103.5MHz
C34-36	M/D output buffer	35MHz-38MHz
C37	M/D input buffer	35 35MHz-38.5MHz 3/A N LO1
C38	MA/N LO1 output buffer	73 35MHz-103.5MHz
C39	REF buffer	10MHz Reference of PLL IC1
C40	MA/N LO2 output buffer	84 22MHz
C41	Buffer	5 53MHz for MA/N VB
C42	Amplifier	5 53MHz for MA/N VB
C43	AGC amplifier	5 53MHz for MA/N VB
C44	Amplifier	5 53MHz for MA/N VB
C45	Buffer	MA/N NB1
C46	Switching	MA/N NB2
C47, 48	Switching	MA/N NB3
C49	Switching	MA/N NB2
C50	Switching	On in MONITOR operation
C51	Switching	On in Ctx mode IC4B1
C52	Switching	On in Ctx mode



DESCRIPTION OF COMPONENTS

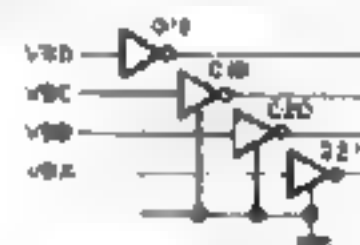
Components	Use/Function	Operation/Condition/Compatibility
D* 2	Reverse current prevention	
D3	Reverse current prevention	FSK, SSB
D4	Reverse current prevention	CNC
D5-9	Reverse current prevention	
D9	Reverse current prevention	KEY
D* 10	Reverse current prevention	
D11	Reverse current prevention	FBC, SARK
D12	Reverse current prevention	FBC, SC
D13	Reverse current prevention	MAAB
D14-15	Reverse current prevention	
D16	Reverse current prevention	VDDC
D17	Reverse current prevention	
D18	Reverse current prevention	FSK, CNC
D21	Reverse current prevention	FANC
D22	Reverse current prevention	
D23	Reverse current prevention	VBC, VEC
D24	Voltage regulator	VIC
D25, 26	Reverse current prevention	UNLOCK signal
D27	Voltage regulator	VCCB
D28, 29	NB detection	N62
D30	NB detection	N61
D31	Reverse current prevention	MONITOR
D32	Reverse current prevention	PXB
D33	Reverse current prevention	

PLL UNIT (X50-3100-00)

Components	Use/Function	Operation/Condition/Compatibility
IC1	AVP	8V PL and CAR unit
IC2	PLL1 (MAIN LO) (10kHz step with 10kHz coverage)	2,3,4 Divided ratio setting input 5 10MHz input 7 LOCK voltage output 8 UNLOCK output when unlocked "4" 11 55-56MHz input
IC3	Divider (1/20)	4 55-56MHz input 8 2.9-2.9MHz output
IC4	Mixer (MX4)	1 12.9-12.9MHz input 2 2.9-2.9MHz input 5 10MHz input
IC5	Mixer (MX3)	1 36.6-37.7MHz output 2 12.9-12.9MHz input 5 48.5-48.5MHz input
IC6	PLL2 (MAIN LO) (10kHz step with 800kHz coverage)	2,3,4 Divided ratio setting input 5 10MHz input 7 LOCK voltage output 8 UNLOCK output when unlocked "4" 11 36.6-37.7MHz input
IC7	Divider (1/20)	1 48.5-48.5MHz input 4 4.35-4.35MHz output
IC8	Mixer (MX2)	1 25.05-25.05MHz output 2 4.95-4.95MHz input 5 40MHz input
IC9 (1/2)	Divider (1/2)	5 20MHz input 9 10MHz output
IC10	PLL3 (SUB LO)	2,3,4 Divided ratio setting input 5 10MHz input 7 LOCK voltage output 8 UNLOCK output when unlocked "4" 11 109-107MHz input
IC11	Divider (1/20)	4 109-107MHz input 5 5.45-5.35MHz output
IC12	Mixer (MX12)	1 25.45-25.35MHz output 2 5.45-5.35MHz input 5 20MHz input
IC13	Divider (1/10)	1 25.45-25.35MHz input 4 2.545-2.535MHz output
IC14	Mixer (MX11)	1 12.545-12.535MHz output 2 2.545-2.535MHz input 5 10MHz input
IC15	Mixer (MX10)	1 38.205-38.215MHz output 2 12.545-12.535MHz input 5 40.75MHz input
IC16	Mixer (MX9)	1 1.95-31.85MHz output 2 38.205-38.215MHz input 5 40.055-40.055MHz input
IC17	PLL7 (SUB LO) (10kHz step)	2,3,4 Divided ratio setting input 5 10MHz input 7 LOCK voltage output 8 UNLOCK output when unlocked "4" 11 1.85-31.85MHz input
IC18 (1/2)	PLL7 PF	10kHz-7.5kHz active filter (Reference frequency 10kHz)
IC18 (2/2)	PLL7 PF	7.5kHz-30kHz active filter (Reference frequency 10kHz)
D1	MX4 input buffer	10MHz

DESCRIPTION OF COMPONENTS

Components	Use/Function	Operation/Condition/Compatibility
Q2	MIX3 input buffer	48.5-44.5MHz
Q3	PLL2 IC input amplifier	36.6-31.7MHz
Q4	Doubler	40MHz
Q5	MAIN local output buffer	35.05-35.54MHz PLL1 output
Q6	TTL input amplifier	20MHz
Q7	MIX12 input buffer	20MHz
Q8	MIX11 input buffer	10MHz
Q9	MIX10 input buffer	50.75MHz
Q10	MIX9 input buffer	40.055-70.055MHz
Q11, 12	PLL7 IC input buffer	1.88-3.885MHz
Q13	VCO7 output amplifier	40.055-70.055MHz
Q14	SUB _01 output buffer	40.055-70.055MHz
Q15	OSC2	50.75MHz SUB _02
Q16	OSC2 buffer	
Q17	SUB _02 output buffer	50.75MHz
Q18	Switching	VCO select: 0.5-30MHz out
Q19	Switching	VCO select: 1.45-21.5MHz out
Q20	Switching	VCO select: 17.5-14.5MHz out
Q21	Switching	VCO select: 1.2kHz-7.5MHz out
Q22	Switching	UNLOCK detection (PLL2,3,4,5 & 6)
Q23	Switching	UNLOCK detector (PLL7 & 8)
Q24	Reverse current prevention	UNLOCK signal
Q25	VCO3 frequency adjustable	
Q26	Reverse current prevention	UNLOCK signal
Q27	VCO2 frequency adjustable	
Q28	Reverse current prevention	UNLOCK signal
Q29	VCO7 frequency adjustable	
Q30	Voltage regulator	VCO7
Q31	Reverse current prevention	UNLOCK signal
Q32	Voltage regulator	OSC2




CAR UNIT (X50-3110-XX) -00: S -01: SD

Components	Use/Function	Operation/Condition/Compatibility
IC1	PLL5 (MAIN _04)	2,3,4 Divided ratio setting input 5 10MHz input 7 LOCK voltage output 8 UNLOCK output when unlocked "H" 11 35.5MHz input
IC2	Divider (1/100)	4 35.5MHz input 8 35.5kHz output
IC3	PLL6 (MAIN _03)	2,3,4 Divided ratio setting input 5 10MHz input 7 LOCK voltage output 8 UNLOCK output when unlocked "H" 11 7.5MHz input
IC4	Divider (1/100)	4 71.5MHz input 8 71.5kHz output
IC5	Mixer (MIX07)	1 9.285MHz output 2 71.5kHz input 5 10MHz input
IC6	PLL4 (MAIN and SUB CAR)	2,3,4 Divided ratio setting input 5 10MHz input 7 LOCK voltage output 8 UNLOCK output when unlocked "H" 11 69.5MHz input
IC7	Divider (1/100)	4 69.5MHz input 8 69.5kHz output
IC8	Mixer (MIX13)	1 10.695MHz output 2 69.5kHz input 5 10MHz input
IC9	PLL3 (MAIN CAR)	2,3,4 Divided ratio setting input 5 10MHz input 7 LOCK voltage output 8 UNLOCK output when unlocked "H" 11 59.5MHz input
IC10	Mixer (MIX5)	1 10MHz output 2 59.5MHz input 5 69.5MHz input
IC11	Mixer (MIX8)	When Ony PLL- 60kHz 1 80kHz output 2 9.92MHz input 5 10MHz input
IC12	Divider (1/100)	4 10MHz input 8 10kHz output
IC13	PLL (EXT STD)	9 1MHz input 13 LOCK voltage output 14 10kHz input

DESCRIPTION OF COMPONENTS

Component	Use/Function	Operation/Condition/Compatibility
IC14	Divider (1/2, 1/5)	1 10MHz output 11 2MHz output 12 10kHz input 14 20MHz input
IC15 (1/2)	Divider (1/2)	1 1MHz output 3 2MHz input
IC15 (2/2)	Divider (1/2)	1 4.25kHz output 13 2.125kHz output
IC16	Divider (Programmable)	1, 4 20kHz output 3-6, 11-14 Divided rate setting input 7 Enable FSK 8 1MHz input
C17 (1/2)	2 line-4 line decoder	1 Enable FSK 2, 3 AFSK space frequency setting input 4-7 Divided rate setting output (space)
C17 (2/2)	2 line-4 line decoder	9, 12 Divided rate setting output (mark) 10, 11 Mark, space select output 13 Key code output 14 Shift FWD, REV select input
Q1	MAIN LO4 output buffer	355kHz
Q2	MIX7 input buffer	10MHz
Q3	MAIN LO3 output amplifier	9.285MHz
Q4	MIX 3 input buffer	10MHz
Q5	SUB CAR output amplifier	13.855MHz
Q6	MIX5 input buffer	69.5MHz
Q7	MIX5 input buffer	69.5MHz
Q8	MIX8 input buffer	9.82MHz with CH PLL + 150kHz
Q9	MIX8 input buffer	3MHz
Q10	AFT output buffer	30-150kHz in CW mode
Q11	MAIN CAR output buffer	1.2MHz
Q12	EXT STD buffer	1.2MHz
Q13	CSC1	20MHz IS'DI
Q14	CSC1 buffer	SC1 buffer when SC2 operates
Q15	TTL input amplifier	20VHz
Q16	REF output amplifier	20kHz PL, 1MHz
Q17	REF output amplifier	10kHz AF unit
Q18	REF output amplifier	10kHz DSP unit
Q19	AFSK output buffer	2 * 25kHz Active on-pass filter
D1	Reverse current prevention	UNLOCK signal
D2	VCO5 frequency adjustable	
D3	Reverse current prevention	UNLOCK signal
D4	VCO6 frequency adjustable	
D5	Reverse current prevention	UNLOCK signal
D6	VCO4 frequency adjustable	
D7	Reverse current prevention	UNLOCK signal
D8	VCO9 frequency adjustable	
D9	VCO10 frequency adjustable	OSC
D10	Voltage regulator	OSC
D11-13	Reverse current prevention	AFSK divided setting (mark and mark, space select)
D14	Reverse current prevention	

FILTER UNIT (X51-3068-XX) -00 : TS-950S (K,M,W,X,P) -01 : TS-950S (L,M,W,X,P) -01 : TS-950S (W2) -02 : TS-950SD (W2)

Component	Use/Function	Operation/Condition/Compatibility
C1	Band data decoder	
IC2	Relay driver	
IC3	AVR	+5V
Q1	Relay driver	10f relay
D1	Relay surge absorber	16-25MHz JFET relay

DESCRIPTION OF COMPONENTS

Component	Use/Function	Operation/Condition/Compatibility
C2	Relay surge absorption	2.5-4.0kHz LPF relay
C3	Relay surge absorption	4.0-7.5kHz LPF relay
C4	Relay surge absorption	7.5-10.5kHz LPF relay
C5	Relay surge absorption	10.5-14.0kHz LPF relay
C6	Relay surge absorption	14.0-21.0kHz LPF relay
C7	Relay surge absorption	21.0-30.0kHz LPF relay
C8	RF rectifier	RF rectifier
C9	RF rectifier	FWD rectifier
C10	Relay surge absorption	Transmit/receive select relay
C11	LPF select	18.2MHz
C12	LPF select	25.2MHz
C13,14	Level shift	12V relay drive
D1	Lightning surge protection	RFI filter not to be absorbed


CONTROL UNIT (X53-3230-00)

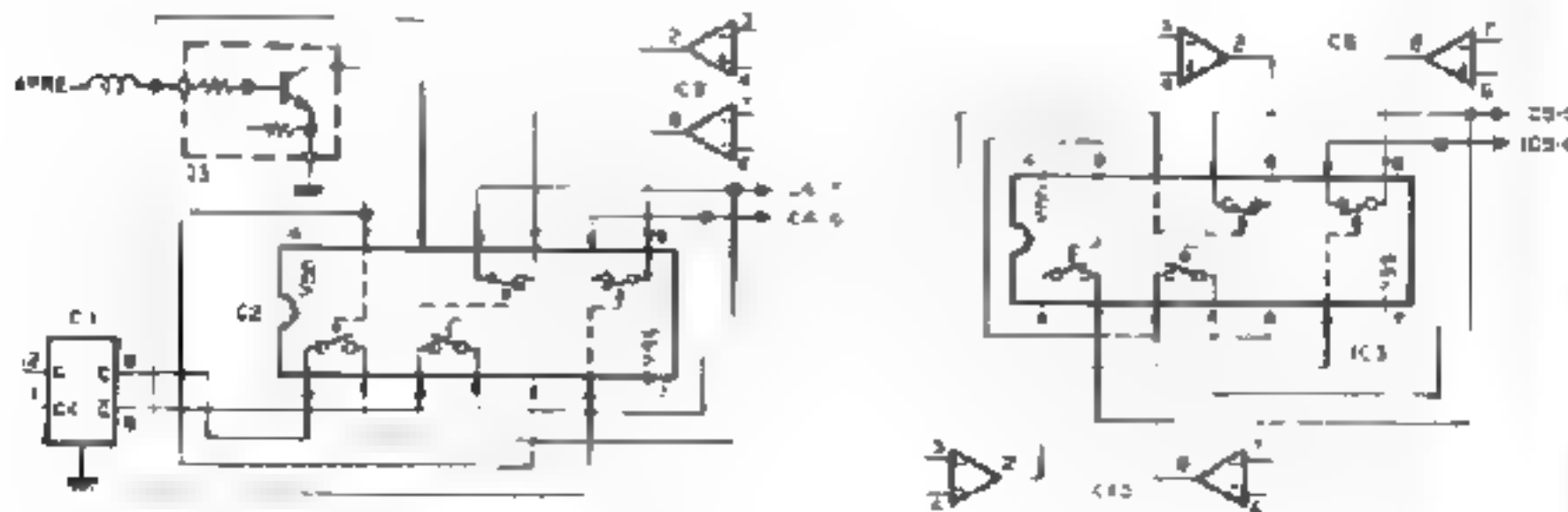
Component	Use/Function	Operation/Condition/Compatibility
IC1	Inverter	1-2, 3-4, 5-6, 12-13 FULL VOX 2-9 10-11 Pulse delay
IC2	NAND gate	1-2, 3-4, 5-6 1-2, 3-13 VOX, FULL
IC3	Analog switch	VOX, FULL
IC4	Analog switch	1-2, 13, 3-4, 5-6 CKY
IC5	Inverter	8-9 10-11, 12-13 CKY
IC6	NAND gate	1-2, 3-4, 5-6 RAC
IC7	Audio amplifier	
IC8	Operational amplifier	A.C. and C meter
IC9	Analog switch	Meter select
IC10	One shot multi vibrator	2-3, 4-5, 6-7 CKY timing 10-11, 12, 13-14, 15 Set-break in timing
IC11	Operational amplifier	2-3 Power meter
IC12	3-terminal A/V	10-11, 12, 13-14, 15
IC13	Inverter	1-2, 3-4 Pulse delay
IC14	Electronic key controlled CPL	
IC15	NAND gate	2-3, 4-5, 6-7 key speed select stop
Q1	ALC amplifier	
Q2	Amplifier	SWR protection amplifier
Q3	Amplifier	C protection amp for
Q4	Voltage shift	ALC meter voltage output
Q5	Buffer	ALC voltage control
Q6	Switching	1/2 select ALC/C
Q7	Switching	Standby control
Q8	Switching	VOX
Q9	Switching	Discharge
Q10,11	Differential amplifier	A.C. amp for
Q12	Switching	R output drive
Q13-16	Switching	AT time
Q17	Switching	KEY
Q18	Switching	FULL
Q19	Switching	Power
Q1	Reference voltage	1.8V
Q2,3	Voltage shift	EX, ALC
Q4	Temperature compensation	IC protector
Q5	Voltage shift	4.7V
Q6	Voltage shift	ALC
Q7	Reverse current prevention	ALC
Q8	Reference voltage	4.7V

DESCRIPTION OF COMPONENTS

Components	Use/Function	Operation/Condition/Compatibility
D9	Discharge	
D10	Switching	Transistor and automatic antenna tuner
D11	Switching	AT and keying
D12	Over load prevention	
D13	Reverse current prevention	
D14	Surge voltage absorption	
D15 B	Switching	Transmit signal
D17	Switching	CEV
D18	Reverse current prevention	
D19	Surge voltage absorption	
D20	Switching	CW3
D21	Switching	CEV
D22	Switching	Transmit
D23	Switching	ATS and CEV
D24	Switching	Transmit
D25	Switching	CEV
D26	Switching	Transmit
D27	Switching	CW sense-break on and delay
D28	Switching	Temperature R ₁ output diode
D29	Switching	28M-2 R ₂ output diode
D30	Switching	AT
D31	Reverse current prevention	Keying diode
D32	Reverse current prevention	Keying diode

AT UNIT (X53-3240-00)

Components	Use/Function	Operation/Condition/Compatibility																
C1	D flip-flop	Differential phase detection.  <table><caption>Function table</caption><thead><tr><th colspan="2">INPUTS</th><th colspan="2">OUTPUTS</th></tr><tr><th>CLOCK</th><th>D</th><th>Q</th><th>\bar{Q}</th></tr></thead><tbody><tr><td>-</td><td>L</td><td>L</td><td>H</td></tr><tr><td>L</td><td>X</td><td>Q₀</td><td>\bar{Q}_0</td></tr></tbody></table>	INPUTS		OUTPUTS		CLOCK	D	Q	\bar{Q}	-	L	L	H	L	X	Q ₀	\bar{Q}_0
INPUTS		OUTPUTS																
CLOCK	D	Q	\bar{Q}															
-	L	L	H															
L	X	Q ₀	\bar{Q}_0															
C2	Analog switch	Control speaker motor 1																
C3	Analog switch	Control speaker motor 2																



DESCRIPTION OF COMPONENTS

Components	Use/Function	Operation/Condition/Compatibility
IC4 IC5	Motor drive Motor drive	Motor 1 Motor 2
IC6	Comparator	Differential modulation detector
IC7	Operational amplifier	Motor control
IC8	Timer	Sine-wave generated
Q1,2	Amplifier	Wave shaping
Q3	Switching	Control signal
Q4,5	Switching	Motor speed control
Q6	Switching	Sine-wave oscillator on or off
Q7,8	Switching	Motor drive
Q9,10	Switching	Timing start
D1,2	Detection	Modulation detection, voltage and current
D3-8	Switching	Clapper
D9	Switching	Voltage drop
D10	Switching	Spike prevention
D11	Switching	Voltage drop
D12	Switching	AT control
D13	Switching	Timing start

DSP UNIT (X53-3268-00) - TS-950SD

Components	Use/Function	Operation/Condition/Compatibility
IC1,2	HPF	HPF input - HPF output select
IC3	Signal select	X - AD converter output select Y - AD converter output select MIC or AF1 Z - AF2 output select AF1 or output of DA converter
IC4	Amplifier filter	1 - MIC input amplifier (Gain 6dB) 2 - MIC HPF
IC5	Amplifier filter	1 - AF input amplifier (Gain 6dB) 2 - MIC HPF
IC6	Limiter	Clapper of the IC7 output

DESCRIPTION OF COMPONENTS

Components	Use/Function	Operation/Condition/Compatibility
C7	Limiting amplifier, 1 ter	1. Clipping amplifier to $\pm 3V_{cc}$ (Gain 20:3) 2. 1st stage of 5th LPF
IC8	F ter	2nd stage of 3rd LPF
IC9	F ter	3rd stage of 3rd LPF
IC10	Sample-and-hold amplifier	6.4 μ s
IC11	Sample-and-hold amplifier, amp ter	1. 6.4 μ s 2. Amplifier Gain 6:3
IC12	A/D converter	4 bit A/D converter
IC13,14	A/D converter and gate array interface	Timing and logic interface of between A/D converter and gate array
IC15	-5V	
IC16	-5V	
IC17	D/A converter	16bit D/A converter
IC18	D/A converter output duty adjust	
IC19	Buffer	
IC20	LPF	3rd LPF Gain 2: 50dB
IC21	Mixer	35.800kHz \rightarrow 455kHz
IC31	DSP	Modulation AF SLOPE
IC32	Gate array	Interface (See to circuit description)
C33	Reset	Reset pulse when drop DC voltage supply
C34	PLL	2,3,4 PLL data setting input 3 10MHz input 7 VCO locked voltage output 1 39.352MHz 2 VCO input
C35	+8V	
C36	Timing creation	Timing signal creation for gate array
Q1	Sample-and-hold amplifier	Switching
Q2	Amplifier	Amplified to fixed level 10% output of the first
Q3	ATT	Switching for ATT On in AM, CMT mode
Q4	455kHz output buffer	
Q5	mixer	Input buffer
Q6	mixer	Output buffer
Q11	Level converter	Level converted to CMOS level from TXB 4415
Q12	10MHz input amplifier	Amplified 10MHz output to PLL IC
Q13	VCO	Oscillator
Q14	VCO buffer	
Q15	VCO buffer	Output buffer to digital section
Q16	C.K. amplifier	Amplified supply level of gate array from PLL output (39.352MHz)
Q17-19	PLL LPF	
Q1	Level shift	Level shift for sample-and-hold amplifier SET
Q2	Limit filter	
Q3	Reverse current prevention	
Q4	VCO var-cap diode	Frequency adjust

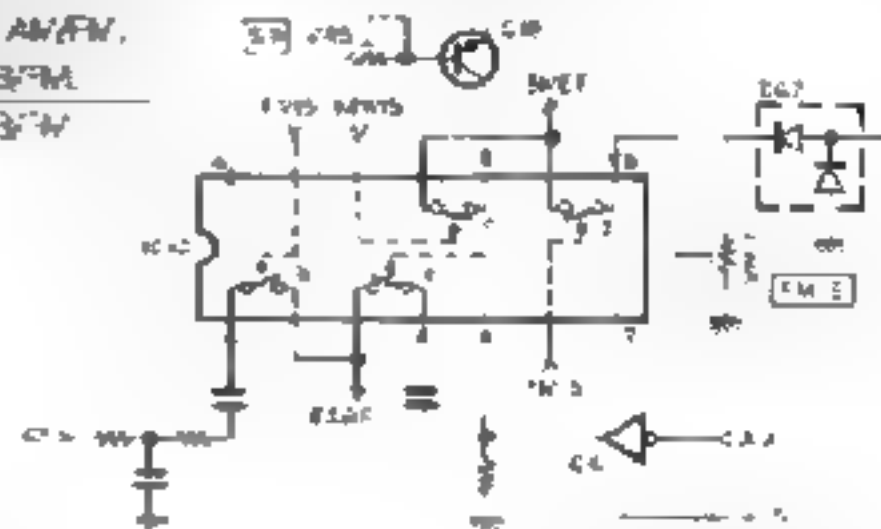
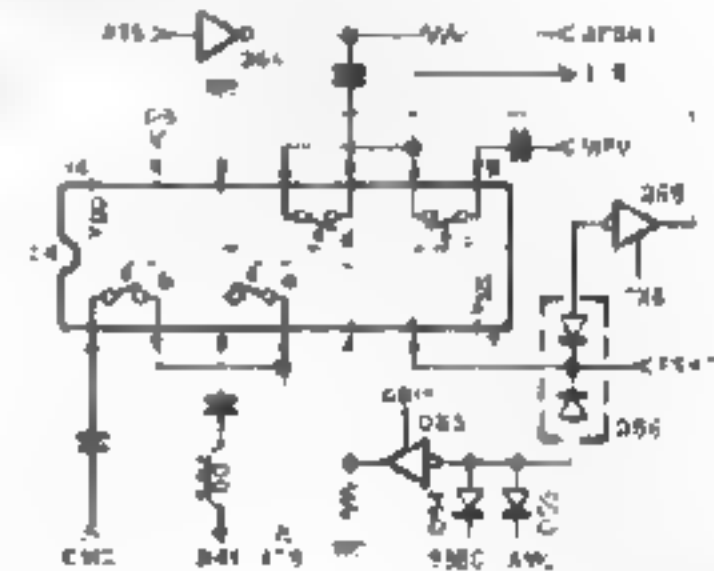
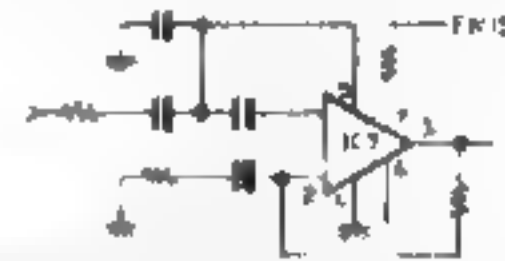
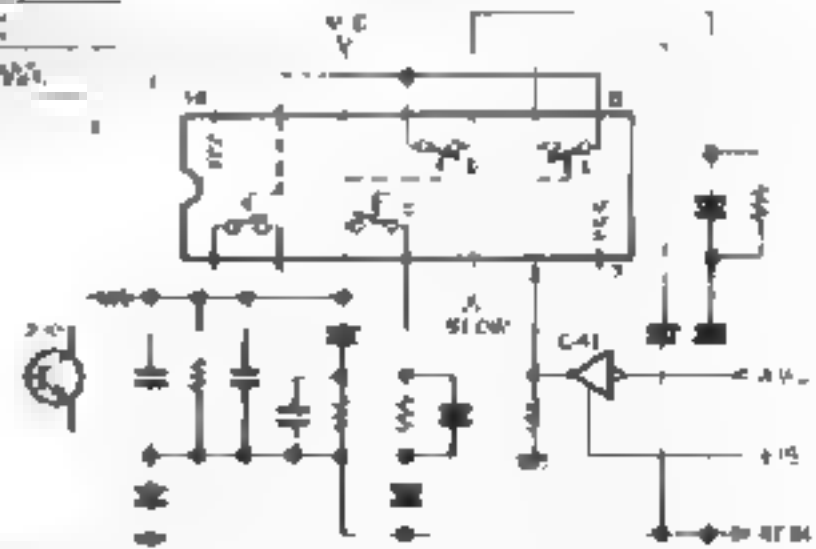
DISPLAY UNIT (X64-3080-00)

Components	Use/Function	Operation/Condition/Compatibility
C1	Display SUB CPU	FL tube, LED sub tone and BZ timer
C2,3	Display gate array	FL tube control port output
C4	Address decoder	Each IC chip select
C5	Function LED select	
C6	Sub-tone output latch	Sub-tone D/A converter output
C7	Inverter	Logic inverter
C8	Sub-tone control, reset control	
C9	Output latch	32 and 600Hz V5-2 data output
C10	Oscillator gate	32 and 1750Hz tone oscillator
Q1-137	FL tube starter driver	FL tube starter voltage driver from TTL level
Q1	FL tube heater bias voltage	Between F and F Approx. AC 9.5V Between FG and G Approx. DC 28V

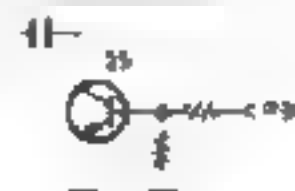
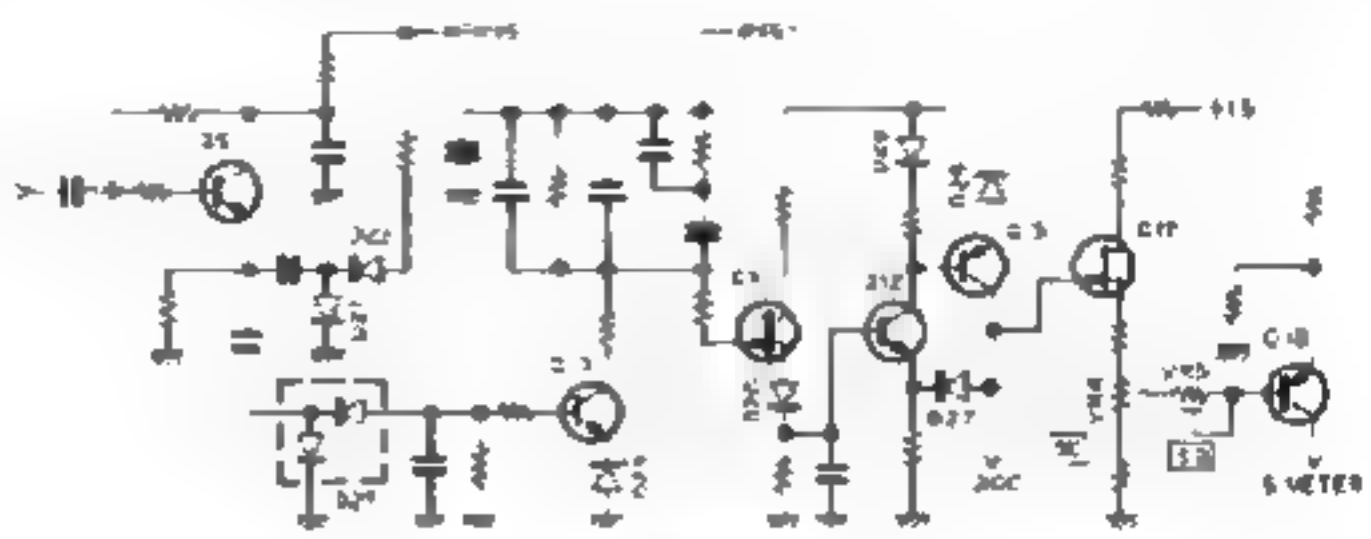
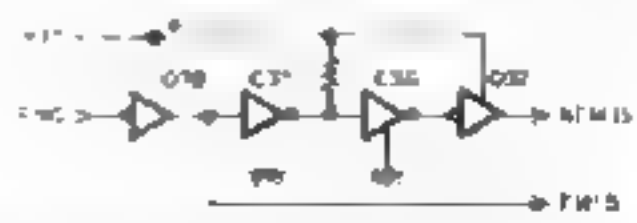
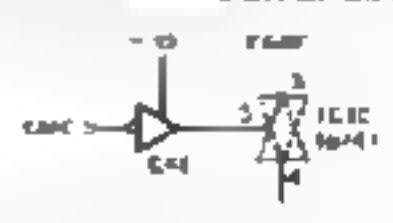
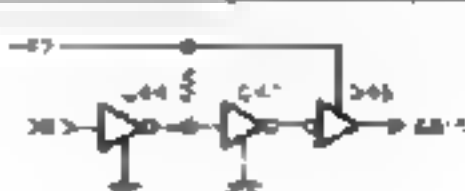
DESCRIPTION OF COMPONENTS

SIGNAL UNIT (X57-3380-00)

Component	Use/Function	Operation/Condition/Compatibility
IC1 (a/4)	AGC select switch	SSB CW and AM mode select
IC1 (b/4)	AGC select switch	AGC time constant 3s/10s
IC1 (c/4)	AGC select switch	AGC time constant 3s/10s
IC1 (d/4)		Unused
IC2 (a/2)	CAF squelch amplifier	
IC2 (b/2)	FM squelch amplifier	
IC3	FM pre-amplifier	
CA1 (a/4)	DSP+G select switch	DSP+G select
CA2 (a/4)	DSP+G select switch	DSP+G select
CA3 (a/4)	DSP+G select switch	SSB, CW, A.M. or FSK select
CA4 (a/4)	DSP+G select switch	On or FSK operation
IC5	Transmitter IF amplifier	455kHz
IC5.7	Receive FM IF amplifier	2 Input: 5 Output
IC6	I/O interface	2-11 I/O 12 SD input 13 SI input 14 CK input
IC9	Transmitter amplifier	1 Input: 5 Output
IC10 (a/4)	Select switch	AGC select of AM/SSB, CW
IC10 (b/4)	Select switch	AF output select of AM/FM
IC10 (c/4)	Select switch	Meter select of SSB/FM
IC10 (d/4)	Select switch	Meter select of SSB/CW
IC12	Receive IF amplifier	455kHz
IC3	Receive 4th mixer	455kHz → 10.7MHz
IC4	IF amplifier	100kHz



DESCRIPTION OF COMPONENTS

Components	Use/Function	Operation/Condition/Compatibility
Q3	Switching	RFC signal 
Q5	Buffer	AF
Q7	Local frequency amplifier	355k Hz
Q8	CAR buffer	150k Hz
Q9	AGC buffer	
Q10-13	AGC amplifier	
		
Q14	Transmitter CAR oscillator	$355k \text{ Hz} \pm 100 \text{ Hz} = 455k \text{ Hz}$
Q15	Transmitter CAR buffer	455k Hz
Q16	Transmitter CAR amplifier	455k Hz
Q17,18	S-meter amplifier	
Q19,20	FM noise amplifier	
Q21	Transmitter IF amplifier	455k Hz
Q22	CAR squelch amplifier	
Q23-27	Transmitter IF buffer	455k Hz
Q28	Receiver FM IF amplifier	455k Hz
Q29	FM AF AGC amplifier	
Q30	Processor amplifier	455k Hz
Q31	Processor amplifier	455k Hz
Q34	FM S-meter amplifier	455k Hz
Q35,36	Switching	
Q37	Switching	NFM/15
Q38	Switching	FM/15 
Q39,40	Switching	
Q41	Switching	AF/15 
Q42,43	Switching	
Q44,45	Switching	
Q46	Switching	AF/15 

DESCRIPTION OF COMPONENTS

Components	Use/Function	Operation/Condition/Compatibility
Q47	Switching	FMC
Q48	Switching	CFM
Q49	Switching	DCA2
Q50	Switching	
Q51-52	Switching	
Q53-55	Switching	FM mode
Q56	Switching	AGC
Q57	Switching	
Q58,59	Switching	D15
Q60	Switching	SS-3P
Q61,62	Switching	CV1
Q63-65	Switching	
Q66	Switching	SC
Q67	Switching	
Q68	Switching	Transmit 455kHz signal
Q69	Switching	Receive 455kHz signal
Q70	Switching	CV1 filter
Q71	Switching	CW filter
Q72	Switching	SSB filter
Q73,74	Switching	AM filter
Q75,76	Switching	Transmit 455kHz signal
Q77	Switching	Receive 455kHz signal
Q78	Switching	NOTCH frequency
Q79-80	Ring detector	SSB CW
Q81	Voltage regulator	5V
Q82,83	Detector	AM
Q84	Detector	AGC
Q85	Reverse current prevention	AGC + FMC
Q86	Voltage shift	3.5V
Q87	Temperature compensation	AGC
Q88	Reverse current prevention	
Q89	Temperature compensator	AGC
Q90	Reverse current prevention	AGC
Q91	Detection	FM signal
Q92	Reverse current prevention	
Q93	Reverse current prevention	CNC
Q94	Reverse current prevention	FSK
Q95	Reverse current prevention	SSB

DESCRIPTION OF COMPONENTS

Components	Use/Function	Operation/Condition/Compatibility
D26	Reverse current prevention	
D37	Reverse current prevention	FMC + CV2
D38	Reverse current prevention	DFM
D39	Reverse current prevention	DCAP
D40	Reverse current prevention	
D41	Ring modulation	SSB
D42	Detection	CAP BONE C1
D43	Protector	Control input
D44	Reverse current prevention	
D45,46	Switching	FM 25-40 Hz
D47,48	Switching	FM 6-12 Hz
D49,50	Detection	FM
D51	Rectifier	FM ACC
D62	Reverse current prevention	SSBC
D63	Reverse current prevention	
D64	Reverse current prevention	SSBC
D65	Reverse current prevention	AVC
D66	Reverse current prevention	
D57	Voltage regulator	12V
D58	Reverse current prevention	
D60	Switching	Processor
D61-64	Switching	455kHz
D65	Limit	Compression meter
D66	Rectifier	Compression meter
D67	Rectifier	FM Stereo
D68,69	Reverse current prevention	
D70	Reverse current prevention	A/S
D71	Voltage regulator	9V

VCO2 (X58-3390-03) : AF UNIT

Components	Use/Function	Operation/Condition/Compatibility
Q1	VCO2 (PLL)	64.22MHz
Q2	VCO2 buffer	
D1	VCO2 frequency variable	

VCO (X58-3630-06) : AF UNIT

Components	Use/Function	Operation/Condition/Compatibility
Q1	VCO1-A (PLL)	73.05-80.53MHz
Q2	VCO1-B (PLL)	80.55-87.53MHz
Q3	VCO1-C (PLL)	87.55-94.53MHz
Q4	VCO1-D (PLL)	94.55-101.05MHz
D1	VCO1-A frequency variable	
D2	VCO1 switching	Or when VAC is "L"
D3	VCO1-B frequency variable	
D4	VCO1 switching	Or when VBC is "L"
D5	VCO1-C frequency variable	
D6	VCO1 switching	Or when VCC is "L"
D7	VCO1-D frequency variable	
D8	VCO1 switching	Or when VDC is "L"

DESCRIPTION OF COMPONENTS

VCO (X5B-3530-01) : PLL UNIT

Components	Use/Function	Operation/Condition/Compatibility
C1	VCO7-D (PLL7)	61 666-70 055MHz
C3	VCO7-C (PLL7)	64 555-61 555MHz
C5	VCO7-B (PLL7)	47 555-54 555MHz
C4	VCO7-A (PLL7)	40 055-47 555MHz
D1	VCO7-D frequency viable	
D2	VCO7 switching	On when VAC is "L"
D3	VCO7-C frequency viable	
D4	VCO7 switching	On when VBC is "L"
D5	VCO7-B frequency viable	
D6	VCO7 switching	On when VCC is "L"
D7	VCO7-A frequency viable	
D8	VCO7 switching	On when VCC is "L"

AVR UNIT (X43-3070-01) (F/6)

Components	Use/Function	Operation/Condition/Compatibility
Q101	Switching	On when over-voltage
D101	Reverse current prevention	
D102	Reference voltage	"3V"
D103	Protection	On when over-voltage

VOX (X59-1080-01) : AF UNIT

Components	Use/Function	Operation/Condition/Compatibility
IC1 (1/2)	VOX level comparator	
IC1 (2/2)	ANT VOX level comparator	
IC2	NOR circuit	
Q1	Switching	Turn on when 11 pin of IC2 is "L"
D12	Reverse current prevention	

FM MIC AMP (X59-3000-03) : AF UNIT

Components	Use/Function	Operation/Condition/Compatibility
C1 (1/2)	Low-pass filter	"2 Output"
C1 (2/2)	Limiting amplifier	5 Input, 7 Output

NB1 (X58-3350-00) : IF, AF UNIT

Components	Use/Function	Operation/Condition/Compatibility
C1	One shot multi-vibrator	Synchronized with pulse 5ms or 40ms
Q12	Switching	On when pulse occurs and Q2 turned off with 40ms

VCO1 (X58-3440-00) PLL, CAR UNIT

Components	Use/Function	Operation/Condition/Compatibility
D1	VCO	38-110MHz
Q1	VCO buffer	

LPF (X59-3450-XX) -00 : AF UNIT -01 : PLL, CAR UNIT

Components	Use/Function	Operation/Condition/Compatibility
Q1-3	PLL low-pass filter	Active filter

DESCRIPTION OF COMPONENTS

MPU (X59-3840-00) : CAR UNIT

Components	Use/Function	Operation/Condition/Compatibility
IC1 (1/2)	Divider (1/2)	
IC1 (2/2)	Divider (1/2)	
Q1	Switching	
Q2	Reverse current prevention	Or when CALS is "L"

SFT (X59-3850-00) : CAR UNIT

Components	Use/Function	Operation/Condition/Compatibility
D1-9	Reverse current prevention	2-5V direct mark

CVT (X59-3880-00) : CONTROL UNIT

Components	Use/Function	Operation/Condition/Compatibility
Q201	Switching	Keying signal
Q202	Switching	Transmitter voltage supply
Q203-206	Switching	Transmitter stop signal
Q206-208	Switching	Keying switch
D201,202	Reverse current prevention	
D203	Reference voltage	3.6V
D204	Reference voltage	4.7V

MAP (X59-3870-00) : CONTROL UNIT

Components	Use/Function	Operation/Condition/Compatibility
IC301	Master amplifier	2.3 5V/8 meter 5.6V 20000 meter

TRX (X59-3880-00) : CONTROL UNIT

Components	Use/Function	Operation/Condition/Compatibility
Q1-61	Switching	Receive voltage supply
Q1-62	Switching	Transmitter voltage supply
Q1-63	Switching	Transmitter
Q1-64,165	Switching	Receiver

ALC (X59-3700-00) : CONTROL UNIT

Components	Use/Function	Operation/Condition/Compatibility
Q251	Switching	CKY and DSP
Q252,253	Switching	Stand-by switch control
Q254	Switching	A* switch
Q255	Switching	Personal computer interface
D251	Reverse current prevention	
D252	Reference voltage	12V

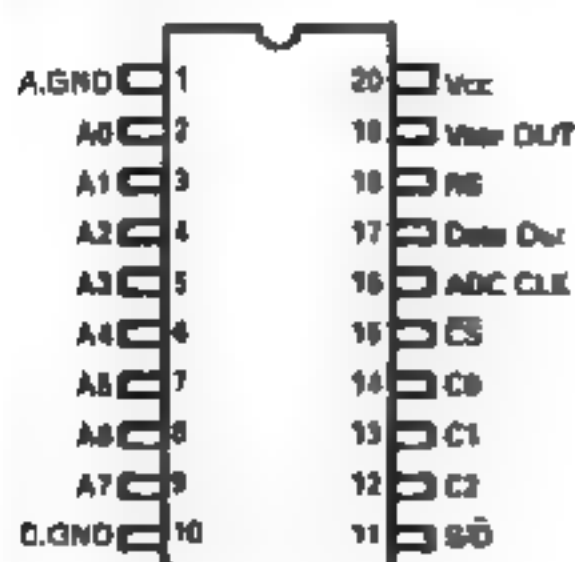
MIC AMP (X59-3710-00) : SWITCH UNIT (A)

Components	Use/Function	Operation/Condition/Compatibility
Q251	MIC amplifier	Amplified vocal signal from MIC
Q252	Packet communication switch	Mixed to MIC amplifier when using a packet communication.
Q253	Data switch	Mixed to MIC amplifier when using a data communication.
Q254	MIC amplifier switch	Mixed to MIC amplifier
Q255	Packet communication stand-by switch	Transmitter signal to supply when using a packet communication.
D251	Reverse current prevention	

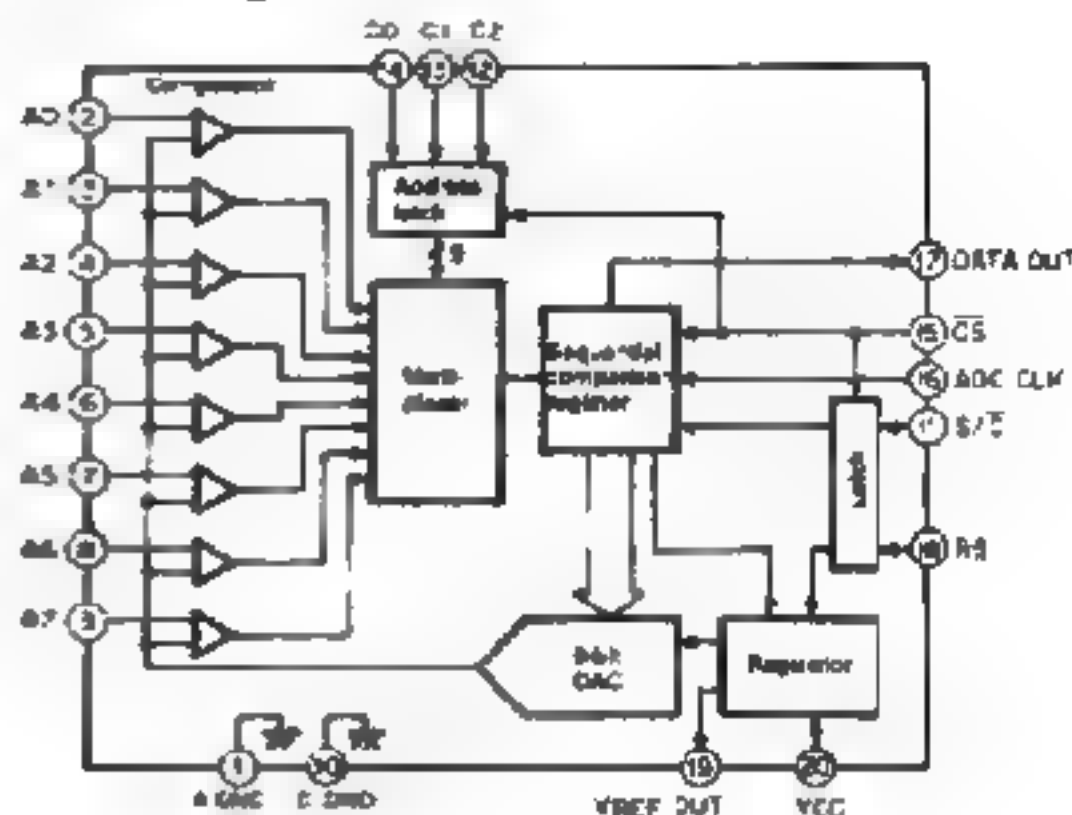
SEMICONDUCTOR DATA

A/D converter : MB4056 (Digital unit IC13)

• Terminal connection



• Block diagram



• Terminal function

Pin No.	Pin name	Name	Function
2-9	A0-A7	Analog input	Eight channel analog input terminals. One channel is selected using channel assignment input terminals C0 through C2.
11	S/D	Conversion mode select input	Selects the A/D conversion mode. When 0, the high and low ranges are converted. When 1, either the high or the low range is converted. The signal is latched on the trailing edge of the CS signal.
12-14	C2-C0	Channel assignment input	Assigns an analog input channel for analog-to-digital conversion. These signals are latched on the trailing edge of the CS signal.
15	CS	Chip select input	Chip select input terminal. When the CS signal is set to 1, then 0, analog-to-digital converter starts and the data output enters the enable state. When analog-to-digital conversion is completed or interrupted, the CS signal is set to 1.
16	ADC CLK	A/D conversion clock input	A/D conversion clock input terminal. The conversion speed is determined by the clock frequency. The clock frequency need not be constant.
17	Data Out	Data output	This is a terminal (open collector) to output the results of analog-to-digital conversion. Output data is synchronised with the ADC CLK signal in the order of start bit, 14SB, 25SB through 15SB, and stop bit.
18	RS	Range select input	Selects the analog input voltage range. When 0, the $V_{RS} = 1.25V$ range is selected. When 1, the $V_{RS} = 5V$ range is selected. The signal is latched on the trailing edge of the CS signal.
19	VREF OUT	Reference voltage output	This is a terminal (regulator output) to output a reference voltage. When the power supply is used at a voltage of 8 to 18V, a regulated 5V voltage is output to the VREF OUT terminal. A maximum of 10mA current can be supplied by this terminal.
1	A.Gnd	Analog ground	Ground terminal.
10	D.Gnd	Digital ground	
20	VCC	Power terminal	

• Range selection

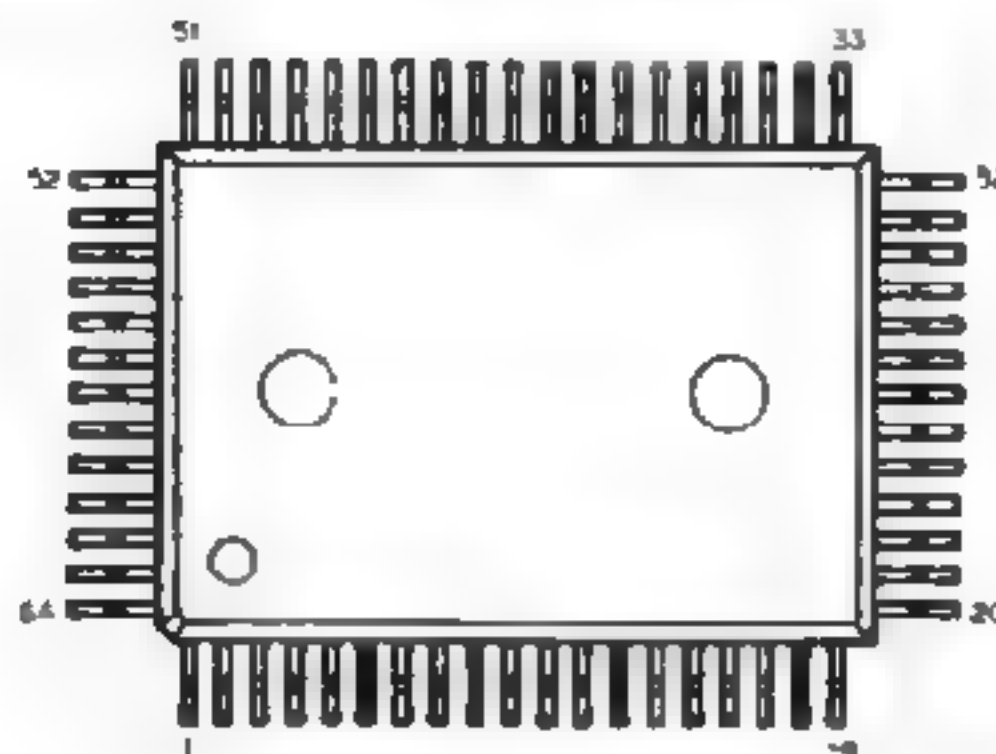
S/D	RS	1st conversion	2nd conversion
0	0	L	H
1	0	H	L
1	1	L	-
1	1	H	-

• Channel selection

C2	C1	C0	Channel selected
0	0	0	A0
0	0	1	A1
0	1	0	A2
0	1	1	A3
1	0	0	A4
1	0	1	A5
1	1	0	A6
1	1	1	A7

I/O port : CXD1095Q (Digital unit IC6, 8)

• Terminal connection

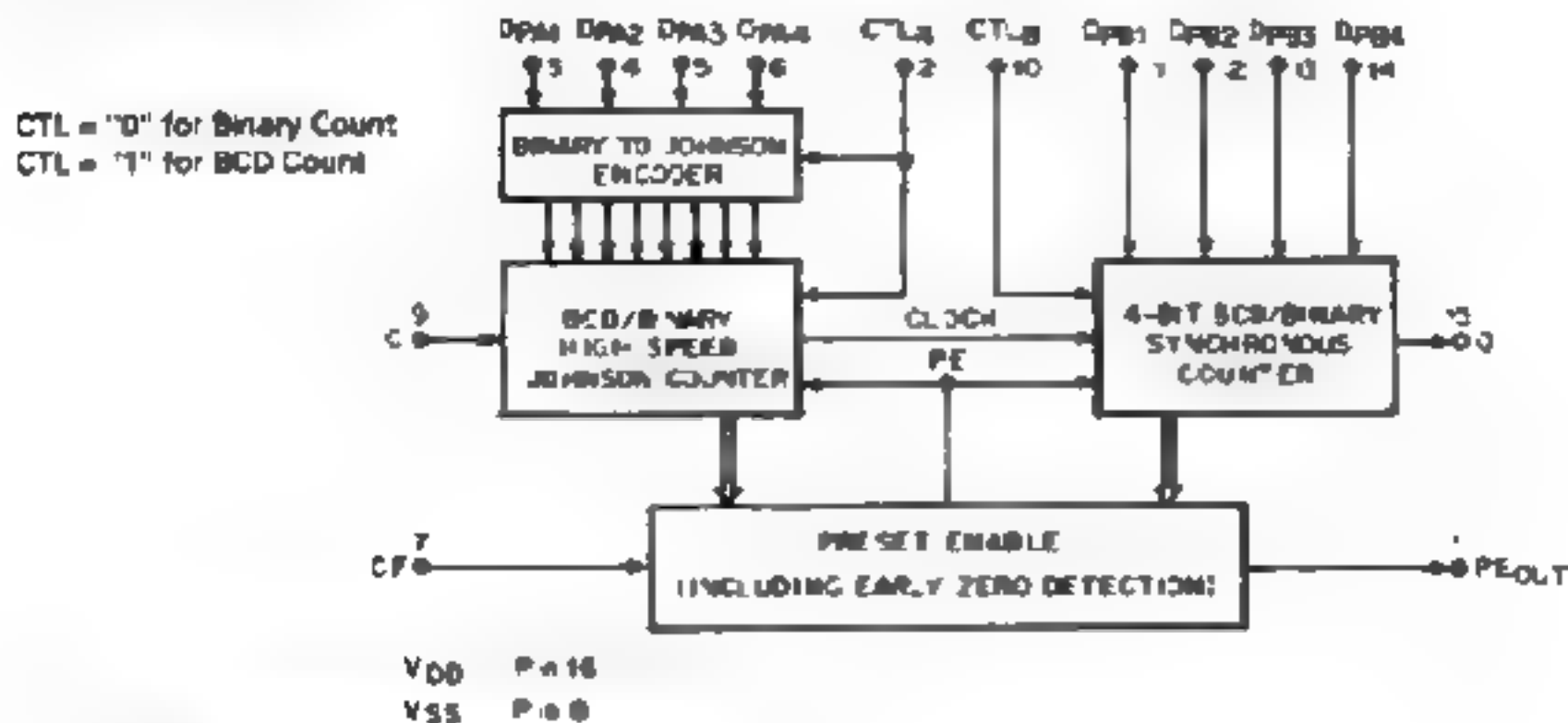


• Terminal function

Pin No.	Pin name	I/O	Function
2	NC	-	Not connected
3-9	PE1-PE7	I/O	Port E input/output terminals
10	Vss	-	Connected to ground
11-18	PC0-PC7	I/O	Port C input/output terminals
19	NC	-	Not connected
20-24	PD0-PD4	I/O	Port D input/output terminals
25	Vss	-	Connected to ground
26	Vcc	-	Connected to +5V
27-30	PD6-PD7	I/O	Port D input/output terminals
30-32	D0-D7	I/O	Eight bit, tri-state, bidirectional data bus. Data can be sent by connecting these terminals to the data bus of a microcomputer system. Goes active when $\overline{CS} = 0$ and $\overline{RD} = 0$ or $\overline{WR} = 0$.
33-34	NC	-	Not connected
35-38	D3-D7	I/O	Eight bit, tri-state, bidirectional data bus. Data can be sent by connecting these terminals to the data bus of a microcomputer system. Goes active when $\overline{CS} = 0$ and $\overline{RD} = 0$ or $\overline{WR} = 0$.
40	\overline{CLR}	I	The register output of port E 14-bit port is cleared (becomes zero) when $\overline{CLR} = 0$.
41	\overline{ODEN}	I	All ports enter the input state (high-impedance state) when $\overline{ODEN} = 0$. No output data register or control register is set.
42	Vss	-	Connected to ground
43	\overline{WR}	I	Data is written into CXD1095Q when $\overline{WR} = 0$. Data bus information is written on the falling edge of the \overline{WR} signal (C to 1).
44	\overline{RD}	I	Data is read from CXD1095Q when $\overline{RD} = 0$.
45	\overline{CS}	I	CXD1095Q is selected when $\overline{CS} = 0$ and enters the non-selection mode when $\overline{CS} = 1$. Data lines D7 through D0 enter the high-impedance state.
46-49	A0-A3		Five ports and control registers are selected by addressing.
49, 50	PE0, PE1	I/O	Port E input/output terminals
51	NC	-	Not connected
52, 53	PE2, PE3	I/O	Port E input/output terminals
54-58	PA0-PA4	I/O	Port A input/output terminals
59	Vss	-	Connected to ground
59	VDD	-	Connected to +5V.
59-63	PA3-PA7	I/O	Port A input/output terminals
64	PC0	I/O	Port C input/output terminals

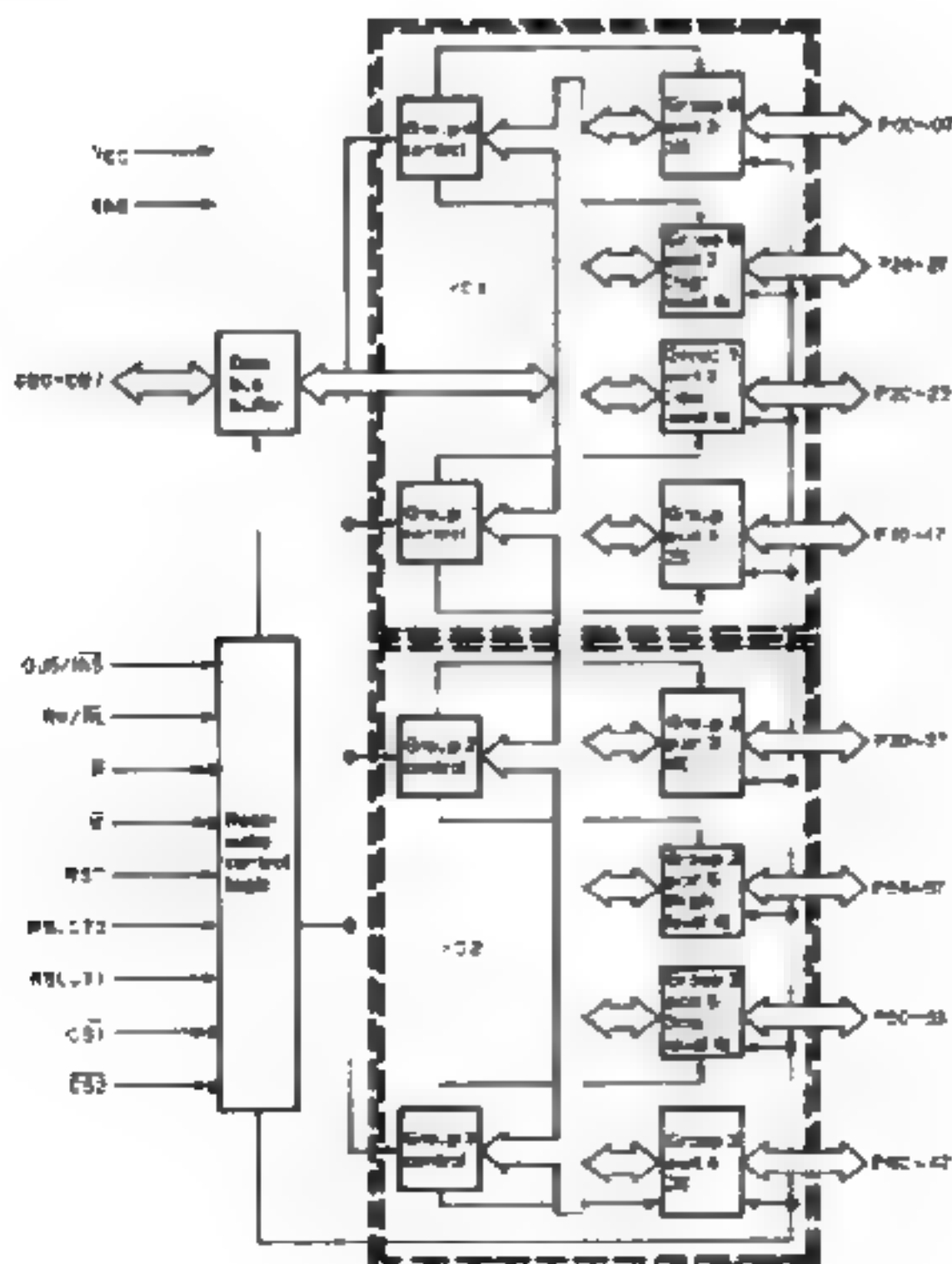
Programmable frequency divider : MC14589BCP (CAR unit IC16)

• Block diagram



I/O port : MB89363B (Digital unit IC7)

• Block diagram



SEMICONDUCTOR DATA

Terminal function

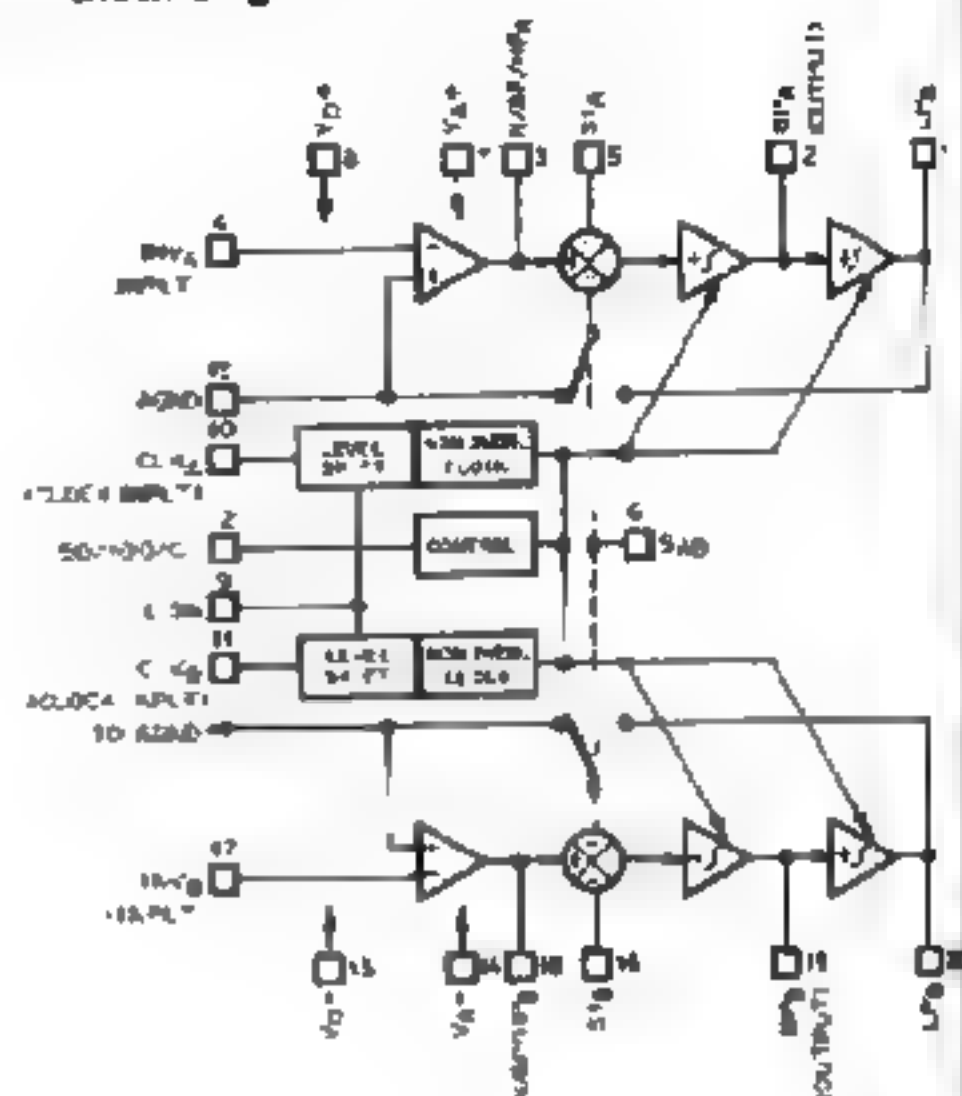
Pin No.	Pin name	Name	I/O	Function
1-4 17-20	P30-P37	Port 3 all bits	I/O	Eight-bit general-purpose input/output port. These terminals are included in group 2. Three operation modes can be selected by setting the control parameter by software.
5	W	Write	I	The control parameter and port output data item can be written using a low-level signal. The parameter and port data can be distinguished and selected using the $\overline{CS1}$, $\overline{CS2}$, RS_CT0 , and RS_CT1 signals.
6	RST	Initial setting reset	I	Input terminal. The M8893538 is set to the initial mode using a reset signal, and initial value 9B hexadecimal is automatically set for two control parameters. The initial mode indicates that all ports are in the input state of mode 0. All port terminals stay high in the initial mode. The active signal level is selected using an $R\text{-}/\overline{A}$ signal. $R\text{-}/\overline{A} = 0$: RS^* active low; $R\text{-}/\overline{A} = 1$: RST active high.
9	R-/A	Reset active level selection	I	The RST terminal is set to active high or active low. $R\text{-}/\overline{A} = 0$: RS^* active low; $R\text{-}/\overline{A} = 1$: RST active high. The $R\text{-}/\overline{A}$ terminal is fixed at either VCC or GND at all times.
11	OVS/INS	Port 0 and 3 read value selection	I	This terminal indicates the output state of ports 0 and 3. It also selects whether the external terminal value of ports 0 and 3 is read directly or whether the output latch value of ports 0 and 3 is read directly when reading the value of ports 0 and 3. $OVS/INS = 0$: The output latch value of ports 0 and 3 is read. $OVS/INS = 1$: The external terminal value of ports 0 and 3 is read.
2-19	DB0-DB7	Bi-directional data bus	I/O	Eight-bit, bi-directional data bus. These terminals are used for data communication with the MPU. The bus signal making and breaking and data direction are controlled using the $\overline{CS1}$, $\overline{CS2}$, \overline{R} and \overline{W} signals.
22-23 26-29	P00-P07	Port 0 all bits	I/O	Eight-bit general-purpose input/output port. These terminals are included in group 0. Three operation modes can be selected by setting the control parameter by software.
39 76	$\overline{CS1}$ $\overline{CS2}$	Device selection	I	When a low-level signal is sent to the terminals, signals DB0 through DB7 are released and data communication with the MPU takes place. At that time, the control parameter is written, and data is written into or read from each port. $\overline{CS1} = 0$, $\overline{V01}$, $\overline{CS2} = 0$ / $\overline{V02}$. Simultaneous selection of $\overline{CS1} = 0$ and $\overline{CS2} = 0$ is inhibited.
32, 74	GND	Ground terminal	CV	
31 32	RS_CT0 RS_CT1	Access selection		When data is sent to the MPU, the parameter and port are distinguished and selected using the $\overline{CS1}$, $\overline{CS2}$, RS_CT0 and RS_CT1 signals.
34-43 43	P20-P27	Port 2 all bits	I/O	These terminals are used as a general-purpose input/output port, handshaking control terminals, and status data of input/output terminals in accordance with the operation functions and modes of groups 0 and 1.
44-51	P10-P17	Port 1 all bits	I/O	Eight-bit, general-purpose input/output port. These terminals are included in group 1. Two operation modes can be selected by setting the control parameter by software.
63	VCC			+5V power
54-61	P40-P47	Port 4 all bits	I/O	Eight-bit, general-purpose input/output port. These terminals are included in group 3. Two operation modes can be selected by setting the control parameter by software.
62 63-71	P50-P57	Port 5 all bits	I/O	These terminals are used as a general-purpose input/output port, handshaking control terminals, and status data of input/output terminals.
76	R	Read		Data from each port is read using a low-level signal. The port type is selected using the $\overline{CS1}$, $\overline{CS2}$, RS_CT0 , and RS_CT1 signals.
78, 12, 24 32, 41, 42 62, 63, 64 72, 73	NC	-	-	Connection to the NC terminal is inhibited.

Switched capacitor filter : MF10CCWM (AF unit IC2)

• Features

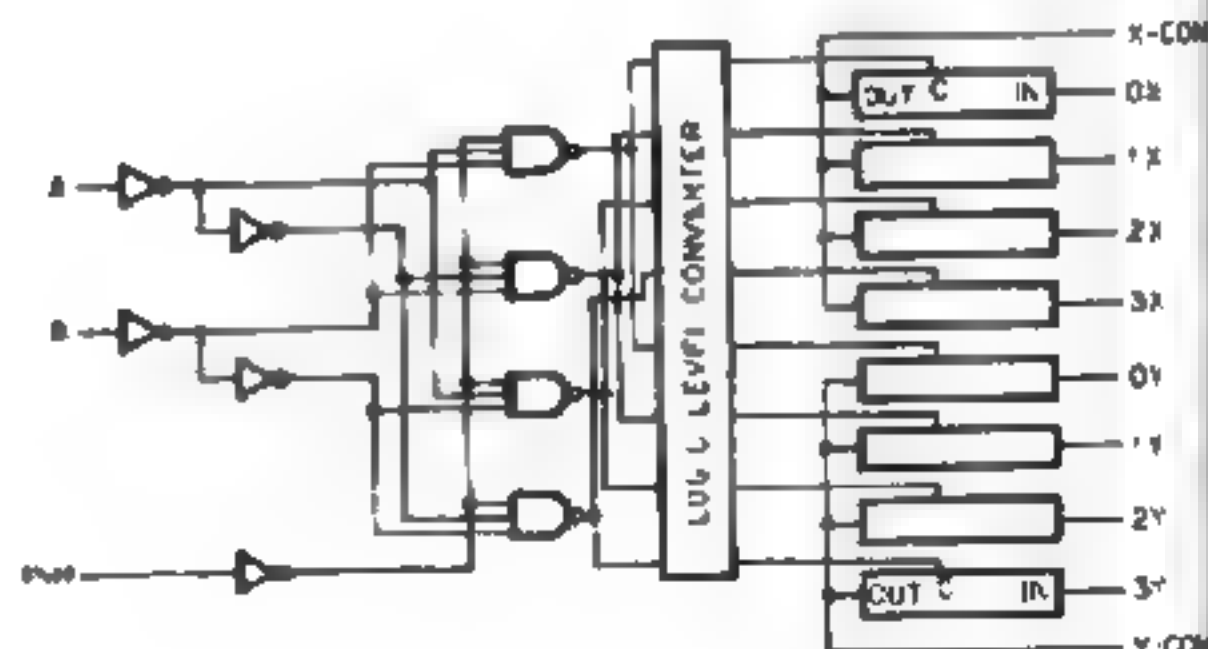
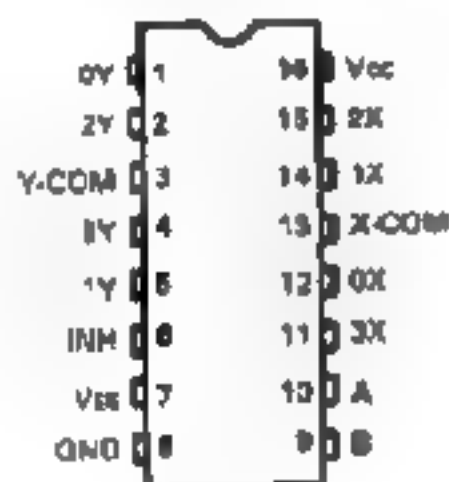
- The cut-off frequency stability varies depending on the external clock
- The cut-off and center frequencies of a filter can be set and altered using the external clock frequency.
- 20-pin DIP package.
- SO package is provided for surface installation.
- Clock and center frequencies have a 1/2000 frequency ratio (f_{CLK}/f_{CL} , $\pm 0.05\%$: MF10AC, $\pm 1.5\%$: MF10C)
- Three independent low-pass, bandpass, and high-pass (or notch or all-pass) outputs.
- The product of center frequency f_0 and Q ($f_0 \times Q$) is 200kHz.
- Input frequency is 20kHz (representative value is 30kHz)

• Block diagram



HPF : MC74HC4052F (DSP unit IC1, 2)

- Terminal connection
- Logic circuit diagram



• Truth table

CONTROL INPUTS			OUT CHANNEL
INH	B	A	
L	L	L	0X, 0Y
L	L	H	1X, 1Y
L	H	L	2X, 2Y
L	H	H	3X, 3Y
L	L	L	-
L	L	H	-
L	H	L	-
L	H	H	-
H	X	X	NONE

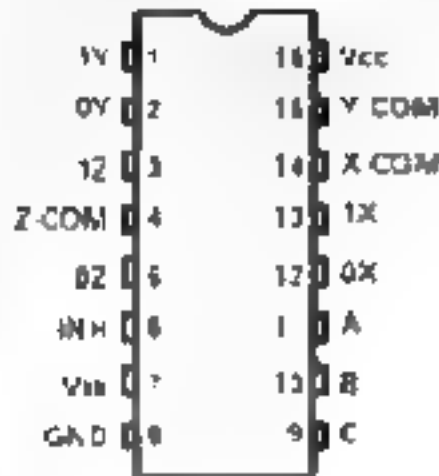
SEMICONDUCTOR DATA

Analog switch : MC74HC4053F (DSP unit IC3)

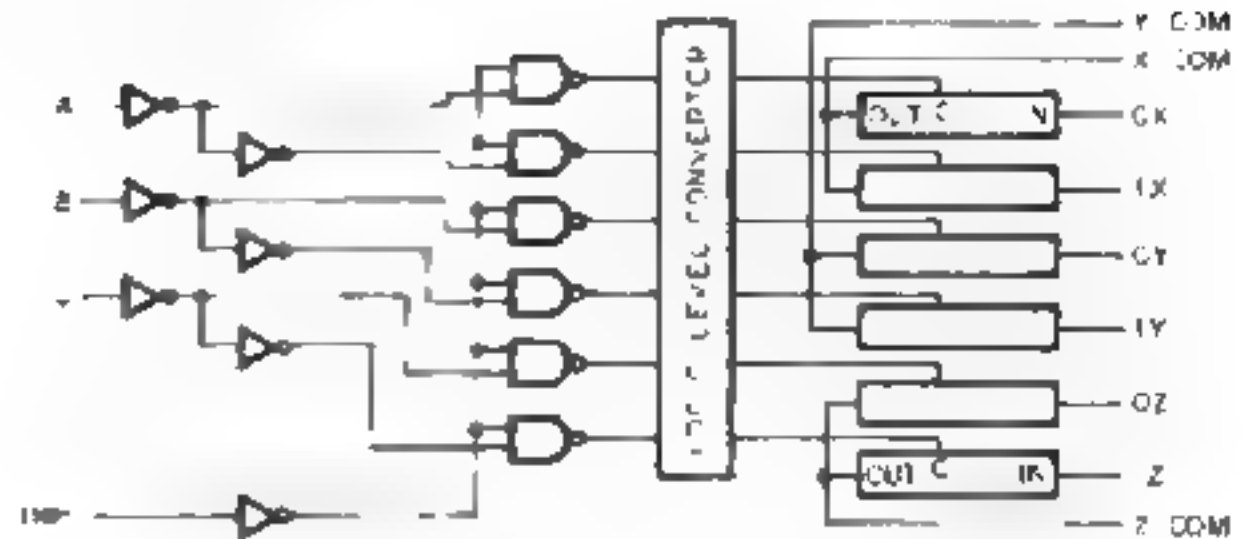
D/A output duty variable : MC74HC4053F (DSP unit IC18)

Mixer : MC74HC4053F (DSP unit IC21)

• Terminal connection



• Logic circuit diagram



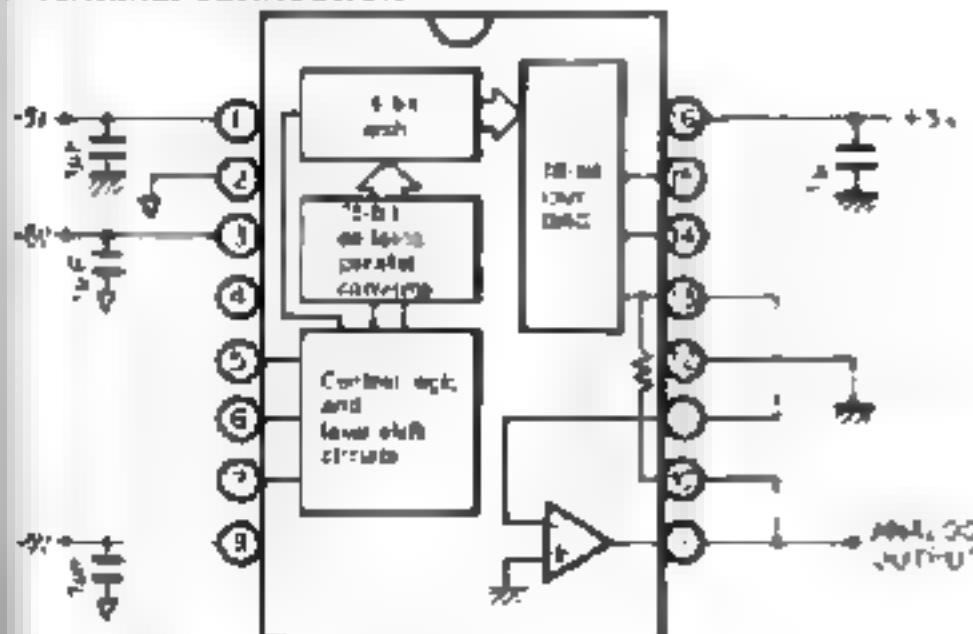
• Truth table

CONTROL INPUTS			CHOOSE CHANNEL	
N-BIT	C	B	A	
-	L	L	L	OX, OY, OZ
-	L	L	H	X, OY, OZ
-	L	H	L	OX, Y, OZ
-	L	H	H	X, Y, OZ
-	H	L	L	OX, OY, IZ
-	H	L	H	X, OY, IZ
-	H	H	L	OX, Y, IZ
-	H	H	H	X, Y, IZ
H	X	X	X	NOV

L: Do not care

D/A converter : PCM56P (DSP unit IC17)

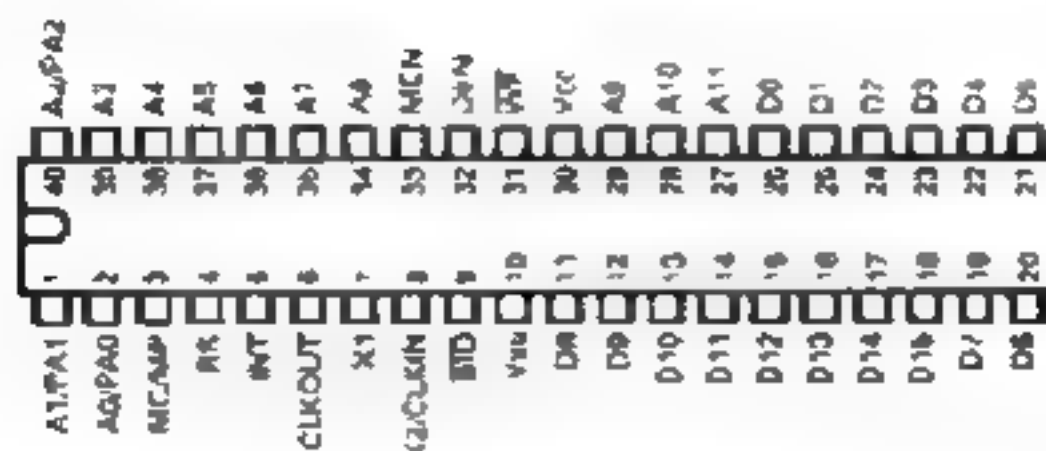
• Terminal connection



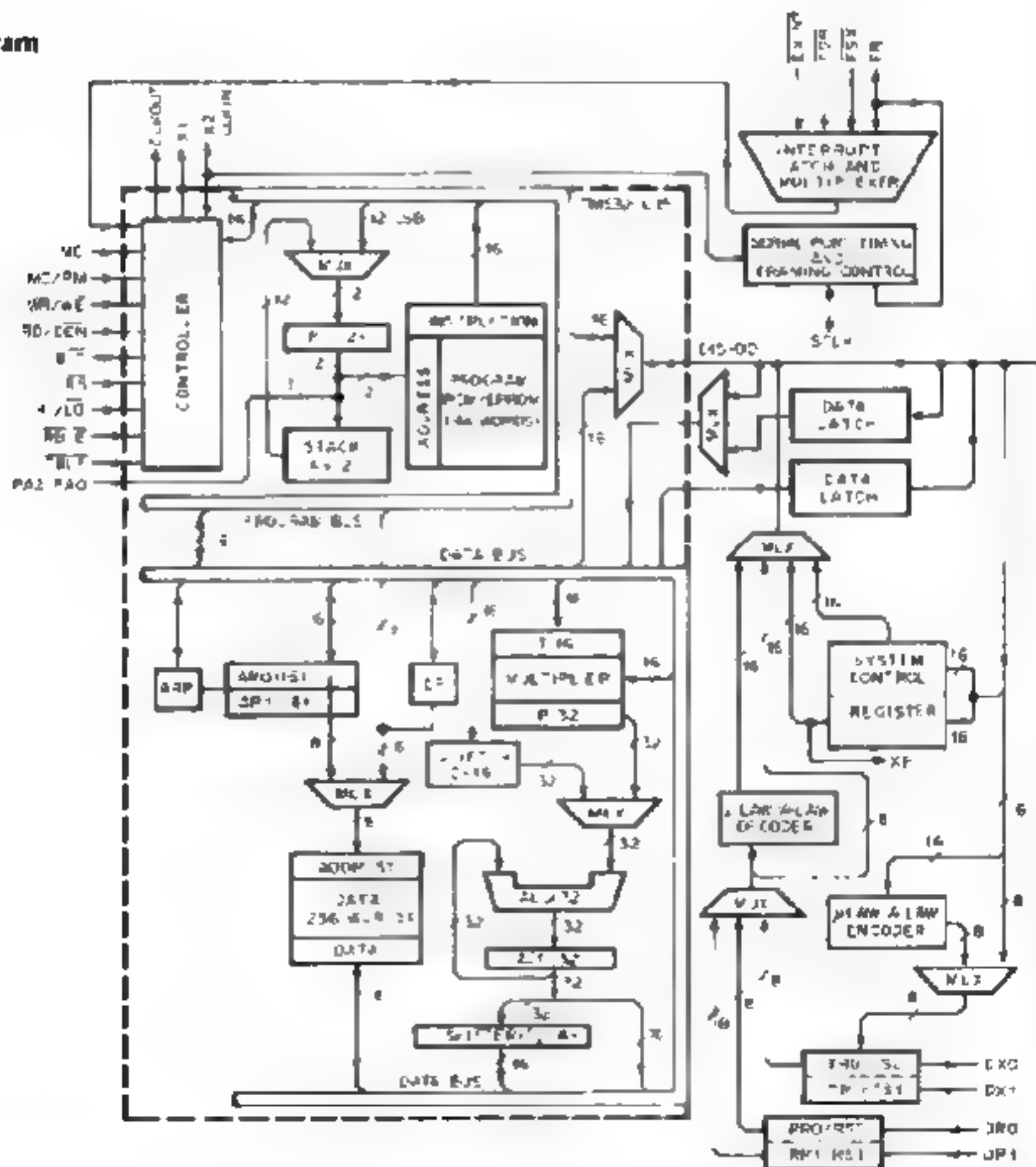
• Terminal function

Pin No.	Pin name	Function
1	-Vs	Analog negative power supply
2	LOG COM	Logic common
3	+Vs	Logic positive power supply
4	NC	Not connected
5	CLK	Clock input
6	Latch enable input	
7	DATA	Serial data input
8	-V	Logic negative power supply
9	Vout	Voltage output
10	FB	Feedback resistor
11	SUM	Summing junction
12	ANA COM	Analog common
13	Iout	Current output
14	W/SB ADJ	W/SB adjustment setting
15	TRIM	W/SB trim potentiometer terminal
16	+Vs	Analog positive power supply

- **Terminal connection**



- **Block diagram**



ACC = ACCUMULATOR
ARP = AUXILIARY REGISTER POINTER
ARO = AUXILIARY REGISTER 0
ARI = AUXILIARY REGISTER 1
DP = DATA PAGE POINTER

PC = PROGRAM COUNTER
P = P REGISTER
T = T REGISTER
TR = TRANSMIT REGISTER
RR = RECEIVE REGISTER

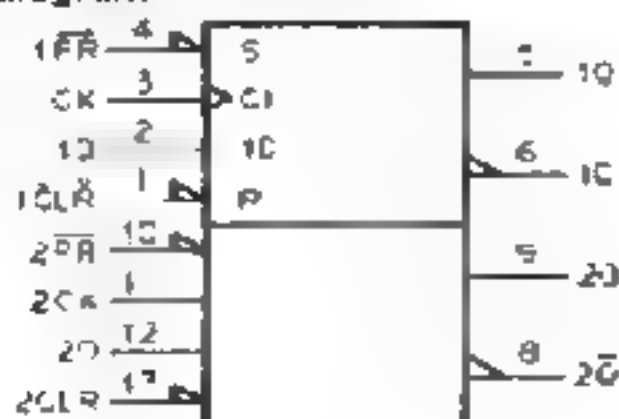
SEMICONDUCTOR DATA

Terminal function

Pin name	Pin No.	I/O	Function
V _{CC}	30	-	Power supply
V _{SS}	10	-	Supply voltage (±5% V _{OH})
			Ground
X2CLK _{IN}	8		Clock
X	7	O	Internal clock crystal input pin (CLK _{IN})
CLKOUT	6	O	Internal clock crystal output pin
			Clock output signal. The CLKOUT signal frequency is 1% of the external clock input or internal clock crystal frequency. The duty ratio is 50%.
WE	31	O	Control
			TMS320C10 indicates the data on the data bus is valid during active low. Goes active in the first cycle only of an OUT command and the second cycle of a FILL command. When the WE signal is active, the MCN and DEN signals are high at all times.
DEN	32	O	TMS320C10 indicates the data is received from the data bus during active low. Goes active in the first cycle only of an IN command. The WEH and WE signals are high at all times.
MCN	33	O	Goes active during when the WE and DEN signals are active during active low. This is a control signal used to fetch commands from on-chip and off-chip program memory.
RS	4		Interrupt
			Reset. When the RS pin is made on for two clock cycles in minimum during active low, the DEN, WE, and WEH signals go high and data lines 0-15 through 16 take on a high impedance. The PC and address lines A11 through A0 are simultaneously cleared on clock cycle after the trailing edge of the RS signal, and all address lines go low. The interrupt mask and interrupt flag register are cleared, but the overflow mode register, data pointer, and auxiliary register pointer are not altered. The device is in reset mode until this signal goes high.
INT	5	I	Interrupt. An interrupt signal is generated on the trailing edge of the INT signal. This edge is used to alter the interrupt flag register (IF) until a device interrupt occurs. The interrupt is also possible when an input/output branch occurs. This branches to the address designated using branch commands when the B0 signal is active (low) during BRCH command execution.
BIO	9	I	Input/output branch control. This branches to the address designated using branch commands when the B0 signal is active (low) during BRCH command execution.
MCMP	3	I	Program memory control
			Microcomputer/microprocessor mode. When MCMP = 1, the microcomputer mode is in effect and there is a 1624-word on-chip program memory. Address 0-255 through 1513 are used for testing. A 2560-word program memory can be installed externally. The mode. When MCMP = 0, microprocessor mode is in effect and all program memory is installed externally.
D15-D0	18-1	O/I	Bidirectional data bus
D7-D0	19-26	O/I	Data lines D15 (MSB) through D0 (LSB) are high impedance except when the WE signal is active (low).
A1-A0	27-29	O	Program memory address bus and port address bus
A8-A3	34-39	O	Program memory address lines A11 (MSB) through A0 (LSB) and port address lines PA2 (MSB) through PA0 (LSB). Lines A1 through A0 are high impedance. Lines A2 through A0 tri-state port address PA2 through PA0 during MCN command execution.
A2-PA2	40	O	
A1-PA1		O	
A0-PA0	2	O	

A/D gate array interface: TC74HC74AF (DSP unit IC14)

Logic circuit diagram



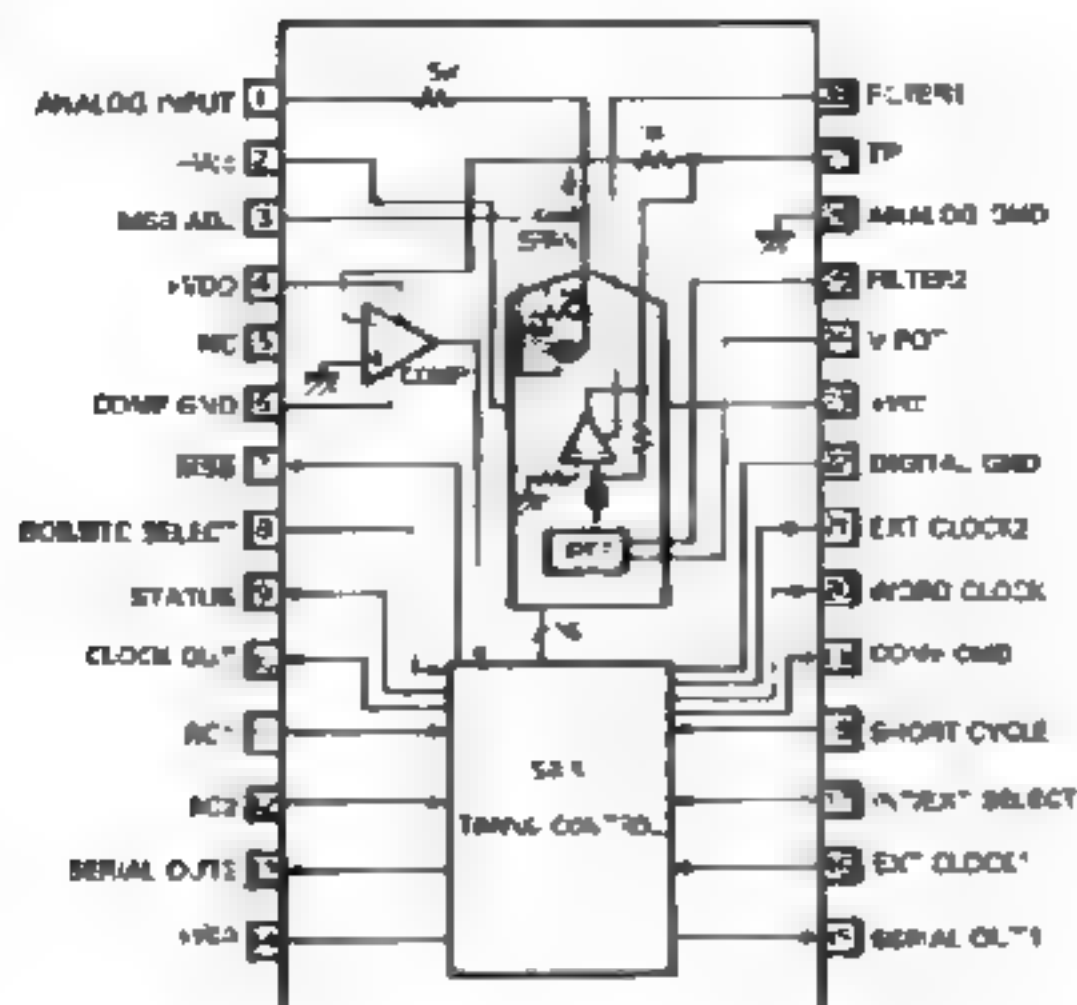
Truth table

INPUTS				OUTPUTS		FUNCTION
CLR	PR	D	CK	Q	\bar{Q}	
L	H	X	X	-	-	CLR
H	-	X	X	-	-	PRESSET
L	-	X	X	-	-	-
H	H	-	X	-	-	-
H	H	H	-	-	-	-
H	H	X	X	Q ⁿ	\bar{Q}^n	NO CHANGE

X: Do not care

A/D converter · PCM78AP (DSP unit IC12)

• Block diagram



• Terminal function

Pin No.	Pin name	I/O	Function
1	ANALOG INPUT	I	A/D converter analog input. pull impedance 1 kΩ. TYP.
2	-VCC	-	Analog -VCC
3	MSB ADJ.	I	MSB adjustment (MSB DIT compensation) input terminal
4	+VDD	-	Comparator +VDD
5	NC	-	
6	COMP GND	-	Comparator ground. usually connected to digital common
7	MSB	O	MSB output terminal
8	BOB/BTC SELECT		Output digital code selection terminal. L: BOB, H: BTC
9	STATUS	O	Status signal output terminal
10	CLOCK OUT	O	Main clock output terminal for SAA operation
11	PC1	-	Internal clock oscillation frequency setting terminal. Pulled up to +VDD by 10kΩ when an external clock is used
12	PC2	-	Internal clock oscillation frequency setting terminal. Pulled up to +VDD by 10kΩ when an external clock is used
13	SERIAL OUT2	O	Serial data output synchronized with EXT CLOCK2 signal
14	+VDD	-	Digital +VDD
15	SERIAL OUT1	O	Serial data output synchronized with external clock or EXT CLOCK1
16	EXT CLOCK1	I	External clock EXT CLOCK1 input. Opened or pulled up when not used
17	INT/EXT SELECT		Internal/external clock selection terminal. L: INT, H: EXT
18	SHORT CYCLE		Short cycle setting input terminal
19	CONV CMD		Conversion command signal input terminal. Set low when not used.
20	WORD CLOCK		WORD CLOCK input terminal. Opened or pulled up when not used
21	EXT CLOCK2		External clock EXT CLOCK2 input terminal. Opened or pulled up when not used.
22	DIGITAL GND	-	Digital ground
23	+VCC	-	Analog +VCC
24	V PCT	O	MSB adjustment reference voltage output terminal
25	FILTER2	-	Internal reference filter. A 3.3μF capacitor is connected to -VCC.
26	ANALOG GND	-	Analog ground. A 2.2μF capacitor is connected to ANAL GND
27	TP	-	Test point for operation check
28	FILTER1	-	Internal reference filter. A 3.3μF capacitor is connected to ANAL GND

PARTS LIST

PRECAUTIONS ABOUT PARTS LIST

● On general purpose chip parts

From a part number, the resistance value and capacity value are omitted, and 9000 is used instead. (Ex. R3410B2BXX00)

In the case, from the circuit diagram, the reference number and resistance value and capacitance value are read, and they are changed into a part number making use of the following table.

In addition, it should be noted that of those parts represented by small reference numbers, some numbers may be unused.

The unused numbers are listed on the circuit diagram.

● On resistance RD14BB

If resistance RD14BB, any part number of less than 1000 is omitted from the parts list.

● On symbols occurring on parts list

- | | |
|------------------------|--|
| ● Indicates new parts | △ Indicates safety critical components |
| E Europe | K USA |
| P Canada | W Europe |
| U PX (Far East Hawaii) | T England |
| BB Other Areas | X Australia |
| LS AA-FES (Europe) | L Northern Europe |

Resistor value	Capacitor value
$22\Omega = 220$ <div style="display: flex; justify-content: space-around;"> <div> <div>Multiplier</div> <div>2nd number</div> <div>1st number</div> </div> <div> <div>Multiplier</div> <div>2nd number</div> <div>1st number</div> </div> </div>	$22pF = 220$ <div style="display: flex; justify-content: space-around;"> <div> <div>Multiplier</div> <div>2nd number</div> <div>1st number</div> </div> <div> <div>Multiplier</div> <div>2nd number</div> <div>1st number</div> </div> </div>
$0.5\Omega = 0R5$	$0.5pF = 0R5$
$1\Omega = 010$	$1pF = 010$
$10\Omega = 100$	$10pF = 100$
$100\Omega = 101$	$100pF = 101$
$1000\Omega = 1K\Omega = 102$	$1000pF = 0.001\mu F = 102$
$10K\Omega = 103$	$0.01\mu F = 103$
$100K\Omega = 104$	
$1000K\Omega = 1M\Omega = 105$	

Letter "R" is used for the decimal point. In this case, it becomes significant figures.

PARTS LIST

View Parts

For a full list of Parts No. see the instruction

Lease, in the instruction for the Parts No. not supplied

Lease, the Parts No. werden nicht ge liefert

Ref. No.	Address No.	Parts No.	Description	Desti- Re- nation- mark 仕 向 記 号
参照番号	位 置 番	部 品 番 号	部 品 名 / 説 明	
TS-950S/SD				
1	1A	* AC1-1073-1	METAL CABINET TOP	KD
-	1A	* AC1-1081-1	METAL CABINET (TOP)	M&W2X
-	1A	* AC1-1082-1	METAL CABINET TOP	KP
-	1A	* AC1-1083-1	METAL CABINET (TOP)	M&W2X
2	1A	* AC1-1074-1	METAL CABINET BOTTOM	KY&A2
2	2A	* AC1-1074-1	METAL CABINET (BOTTOM)	X
2	3A	* AC1-1093-01	METAL CABINET (BOTTOM)	P
3	2D	* A20-7024-12	PANEL	S
3	2D	* A20-7026-02	PANEL	S
4	2D	* A20-7023-12	PANEL ASSY	S
-	2D	* A20-7027-02	PANEL ASSY	S
5	2D	* A23-1111-12	REAR PANEL	S
6	1A	* A40-0524-02	BOTTLE PLATE	S
8	1K	* B04-0412-14	TEEN PLATE	
-	-	* B04-0413-02	TEEN PLATE	P
10	2D	* B10-1115-13	FRONT GLASS	
11	2D	* B11-0466-04	FILTER	
-	-	* B40-3951-14	FRONT NAME PLATE	KP
-	-	* B40-3964-04	METAL NAME PLATE	M
-	-	* B40-3967-04	FRONT NAME PLATE	M&W2
-	-	* B40-7609-04	METAL NAME PLATE	X
-	-	* B41-0135-14	CAUTION LABEL (LIGHTING MARKING)	KP
-	-	* B41-0525-04	CAUTION LABEL (LAMP REPLACEMENT)	KP
-	-	* B42-3243-14	LABEL (S/N)	
-	-	* B42-3265-04	LABEL (PSE SET)	
-	-	* B42-3271-14	LABEL (ACSY REAR PANEL VIEW)	
-	-	* B42-3274-04	LABEL (AC 120/220V)	R
-	-	* B42-3275-04	LABEL (AC 220/230V)	M&W2
-	-	* B42-3276-04	LABEL (AC 120/240V)	X
-	-	* B42-3291-14	LABEL	S
18	2C	* B43-1098-04	BADGE	D
-	-	* B44-2167-14	LABEL (PC CARD)	
-	-	* B46-0425-02	WARRANTY CARD	S
-	-	* B46-0419-10	WARRANTY CARD	M&W2
-	-	* B46-0422-02	WARRANTY CARD	P
-	-	* B40-0298-10	INSTRUCTION MANUAL	
-	-	* B50-0351-02	INSTRUCTION MANUAL (OPTIONAL EXP)	
20	2K	* E04-0162-15	OF COAXIAL CABLE RECEPTACLE	
-	-	* E07-0251-05	OF COAXIAL CABLE ASSY	
-	-	* E07-0251-15	139 REAR CABLE ASSY	
22	3K	* E13-0101-05	PIN JACK	
-	-	* E29-0114-05	CAP	M&W2X
-	-	* E30-0974-05	AC POWER CORD	KM
-	-	* E30-2121-15	AC POWER CORD	S
-	-	* E30-2153-15	AC POWER CORD	M&W2
-	-	* E30-2155-15	AC POWER CORD	X
-	-	* E30-2174-15	CORRE WITH PINPLUG	
-	-	* E31-2048-05	CONNECTING WIRE (AT)	
-	-	* E31-3111-15	CONNECTING WIRE (AT)	
-	-	* E31-3221-25	CONNECTING WIRE (S/N)	
-	-	* E31-6267-05	CONNECTING WIRE (S/N-CORRE)	
-	-	* E31-6268-05	CONNECTING WIRE (S/N-CORRE)	

E: Germany & France K: USA P: Canada W: Japan

L: Finland M: Italy N: England O: Other Areas

U: Australia X: Australia

△ indicates safety critical components

PARTS LIST

* New Parts

Parts without Parts No. are of 3,000 era

Les articles sans numéro de pièce sont de l'époque 3,000

Te a Ona Parts No. worden van 3,000 era

Ref. No.	Address No.	Parts No.	Description	Desti- nation	Re- marks
参照番号	設置番	部品番号	部品名/組物	仕向	備考
-		* E31-6069-05	CONNECTING WIRE(SIG-DIG, 4P-DIG)		
-		* E31-6070-05	CONNECTING WIRE(DIG-SMA) 10P		
-		* E31-6071-05	CONNECTING WIRE(DIG-DIG) 10P		
-		* E31-6072-05	CONNECTING WIRE(P.L-DIG) 24P		
-		* E31-6073-05	CONNECTING WIRE(CENT-DIG) 16P		
-		* E31-6074-05	CONNECTING WIRE(SMA-DIG) 22P		
35	21	* F01-0968-05	HEAT SINK		
36	11	F05-3121-05	FUSE(SMD) 3.15A		
36	11	F05-6021-05	FUSE 3.15A		
36	11	F05-6027-05	FUSE ACSV 6A		
37	1A	* F07-0896-04	COVER(NEW TOP CABINET)		
38	1G	* F07-0897-04	COVER(NEW PANEL PAN SIDE)		
39	25, 2H	* F07-0898-04	COVER(NEW PANEL PAN SIDE)		
40	1	* F11-1139-03	SHIELDING COVER(FINAL)		
41	3C	* F11-1153-03	SHIELDING COVER(RF)		
42	1E	* F20-1022-03	INSULATING BOARD(SW)		
-		* F20-1041-04	INSULATING BOARD(RF SHIELD)		
-		* F20-1042-04	INSULATING BOARD(4P)		
-		* F20-1043-04	INSULATING BOARD(C-ASSIS)		
48	1	G02-0505-05	LEAF SPRING		
49	11	G02-0574-04	FLAT SPRING		
50	1A	G02-0576-04	FLAT SPRING		
50	1A	G10-0454-04	NON-WOVEN FABRIC(SP)		
50	1A	G10-0455-04	WEL-WEVEN FABRIC		
52	1E	* G13-0697-04	NON-WOVEN FABRIC(FILTER)		
53	2C	G13-0698-04	CUSHION(NIC)		
54	2E	G13-0917-04	FRAMED PLATE(NIC)		
55	1A	G13-0919-04	CUSHION(SP)		
56	3H	G13-0927-04	CUSHION(ELECTRO CAP)		
58	2H	G13-0943-04	CUSHION(TRANSFORMER)		
58	2H	G13-0944-04	SHEET(SP)		
-		* H01-0263-04	STEEL CARTON BOX		
-		* H01-0264-04	STEEL CARTON BOX		
-		* H03-2263-04	BLISTER PACKING CASE		
-		* H03-2264-04	BLISTER PACKING CASE		
-		* H03-2265-01	POLYSTYRENE FRAMED FIXTURE		
-		* H03-2266-01	POLYSTYRENE FRAMED FIXTURE		
-		* H12-1413-04	PACKING FIXTURE		
-		* H20-1414-03	PROTECTION COVER		
-		* H25-0117-04	PROTECTIVE BAG(ACSV)		
-		* H25-0118-04	PROTECTIVE BAG(1,0)		
60	3B	J02-0420-04	POST-REAR		
61	3A	J02-0421-04	POST-REAR		
62	7A	J02-0422-04	POST-REAR		
63	1A, 3A	J02-0423-04	POST-REAR		
64	2H	J19-1392-05	LEAF SPRING		
65	2F	J21-4272-04	MOUNTING HARDWARE(CAT. SIM)		
66	2J	J21-4273-04	MOUNTING HARDWARE(CAT. SIM)		
67	2H	J21-4274-04	MOUNTING HARDWARE(CAT. SIM)		
68	2H	J21-4275-04	MOUNTING HARDWARE(CAT. SIM)		
69	2	J21-4276-04	MOUNTING HARDWARE(CAT. SIM)		

E Scandinavia & Europe K USA P Canada W Japan

U Africa & Asia T Australasia S America

OE 4A, 5A, 6A, 7A, 8A, 9A, 10A, 11A, 12A, 13A, 14A, 15A, 16A, 17A, 18A, 19A, 20A, 21A, 22A, 23A, 24A, 25A, 26A, 27A, 28A, 29A, 30A, 31A, 32A, 33A, 34A, 35A, 36A, 37A, 38A, 39A, 40A, 41A, 42A, 43A, 44A, 45A, 46A, 47A, 48A, 49A, 50A, 51A, 52A, 53A, 54A, 55A, 56A, 57A, 58A, 59A, 60A, 61A, 62A, 63A, 64A, 65A, 66A, 67A, 68A, 69A, 70A, 71A, 72A, 73A, 74A, 75A, 76A, 77A, 78A, 79A, 80A, 81A, 82A, 83A, 84A, 85A, 86A, 87A, 88A, 89A, 90A, 91A, 92A, 93A, 94A, 95A, 96A, 97A, 98A, 99A, 100A, 101A, 102A, 103A, 104A, 105A, 106A, 107A, 108A, 109A, 110A, 111A, 112A, 113A, 114A, 115A, 116A, 117A, 118A, 119A, 120A, 121A, 122A, 123A, 124A, 125A, 126A, 127A, 128A, 129A, 130A, 131A, 132A, 133A, 134A, 135A, 136A, 137A, 138A, 139A, 140A, 141A, 142A, 143A, 144A, 145A, 146A, 147A, 148A, 149A, 150A, 151A, 152A, 153A, 154A, 155A, 156A, 157A, 158A, 159A, 160A, 161A, 162A, 163A, 164A, 165A, 166A, 167A, 168A, 169A, 170A, 171A, 172A, 173A, 174A, 175A, 176A, 177A, 178A, 179A, 180A, 181A, 182A, 183A, 184A, 185A, 186A, 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PARTS LIST

* NEW PARTS

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis

Teile ohne Parts No. werden nicht geliefert

Ref. No. 参照番号	Address 位置	Parts No. 部品番号	Description 部品名/規格	Destination 仕向	Remarks 備考
70	17	* J21-4275-04	RESULTING -ADDAARE) R/R)		
71	24	* J21-4277-04	RESULTING HARDWARE READ PANEL)		
72	31	* J21-4278-04	RESULTING -ADDAARE) AT)		
73	33	* J31-0000-04	CELLAR MID)		
74	21	* J32-0000-04	STUE(423)		
75	21	* J32-0910-04	5" J(42R		
		* J42-0000-05	BLS-7AG(AC)		
		* J42-0005-05	PUSHING(AC		
77	20	* J50-0401-05	PINCE		
78	A	* J53-0000-05	CRUSHET		
79	1A	* J59-0002-05	GOCPNET		
		* J61-0003-05	WIRE BAND(S) TRANSFER)		
		* J61-0005-05	WIRE BAND(P.L)		
		* J61-0007-05	WIRE BAND		
80	1B	* K01-0407-05	HANDLE		
81	20	* K21-0709-02	WIRE BAND(TUNING)		
82	20	* K23-0709-04	WIRE BAND(SET)		
83	20	* K23-0709-04	WIRE BAND(SET)		
84	20	* K29-0709-04	WIRE BAND		
85	21	* K29-3172-03	WIRE BAND		
86	21	* K29-3173-04	WIRE BAND		
87	21	* K29-3174-03	WIRE BAND		
88	21	* K29-3175-03	WIRE BAND		
89	21	* K29-3176-03	WIRE BAND		
90	21	* K29-3177-03	WIRE BAND		
91	21	* K29-3178-03	WIRE BAND		
92	21	* K29-3179-03	WIRE BAND		
93	21	* K29-3180-03	WIRE BAND		
94	21	* K29-3181-03	WIRE BAND		
95	21	* K29-3182-03	WIRE BAND		
96	21	* K29-3183-03	WIRE BAND		
97	21	* K29-3184-03	WIRE BAND		
98	21	* K29-3185-03	WIRE BAND		
99	21	* K29-3186-03	WIRE BAND		
100	21	* K29-3187-03	WIRE BAND		
101	21	* K29-3188-03	WIRE BAND		
102	21	* K29-3189-03	WIRE BAND		
103	21	* K29-3190-03	WIRE BAND		
104	21	* K29-3191-03	WIRE BAND		
105	21	* K29-3192-03	WIRE BAND		
106	21	* K29-3193-03	WIRE BAND		
107	21	* K29-3194-03	WIRE BAND		
108	21	* K29-3195-03	WIRE BAND		
109	21	* K29-3196-03	WIRE BAND		
110	21	* K29-3197-03	WIRE BAND		
111	21	* K29-3198-03	WIRE BAND		
112	21	* K29-3199-03	WIRE BAND		
113	21	* K29-3200-03	WIRE BAND		
114	21	* K29-4500-03	WIRE BAND		
115	21	* K29-4502-03	WIRE BAND		
116	21	* K29-4503-03	WIRE BAND		
117	21	* K29-4504-03	WIRE BAND		
118	21	* K29-4505-04	WIRE BAND		
119	21	* K29-4506-04	WIRE BAND		

E: Scandinavia & Europe K: USA P: Canada W: Japan

U: PK (for Excess Items) T: England M: Other Areas

AE: AMERICA (incl.) A: Australia

⚠ Increased safety of all components

PARTS LIST

* New Parts

Parts not in Part No. are not supplied.

Les articles non mentionnés dans le Part No. ne sont pas fournis.

Teile ohne Part No. werden nicht geliefert.

Ref. No.	Address	Part No.	Description	Designation
部品番号	位置	部品番号	部品名 / 説明	位置
120	21	* K29-4507-04	K29 SCAL	
121	2	* K29-4508-04	K29 CCAM	
122	20	* K29-4509-04	K29 LP	
123	20	* K29-4510-04	K29 VEX	
124	10	* K29-4511-04	K29 POWER	
125	10	* K29-4512-04	K29 VEX FULL	
126	10	* K29-4513-04	K29 PROC	
127	20	* K29-4514-04	K29 SOL	
128	20	* K29-4515-04	K29 MAIN MIC	
129	20	* K29-4516-04	K29 S.B.PAR	
130	10, 11	* K29-4517-04	K29 (SEAL) RIT	
131	21	* L01-8421-15	POWER TRANSFORMER (MAIN 20V)	CP
132	21	* L01-8422-15	POWER TRANSFORMER (MAIN 120-100)	VM2X
133	3H	* L01-8423-05	POWER TRANSFORMER (SUB 12V)	KP
134	3H	* L01-8424-15	POWER TRANSFORMER (SUB 120-100)	VM2X
135	3H	* L75-0847-05	FILTER ASSY (YK-880-1)	
A	2K	* M09-0632-04	-EX 38.7	
136	2K	* M09-2051-05	SCREEN	X
137	21	* N14-0509-03	WIT	
138	2K	* N14-1040-46	M-7	
139	20	* N19-0637-04	FLAT WASHER (PANEL)	
B	12, 2P	* N32-2606-46	FLAT HEAD MACHINE SCREW	
C	12, 1H	* N32-3004-46	FLAT HEAD MACHINE SCREW	P
D	10, 3B	* N33-2016-41	WAL HEAD MACHINE SCREW	
E	13	* N35-2604-46	BINDING HEAD MACHINE SCREW	
F	11	* N35-2606-46	BINDING HEAD MACHINE SCREW	VM2X
G	11	* N35-2608-46	BINDING HEAD MACHINE SCREW	
H	21	* N35-3006-46	BINDING HEAD MACHINE SCREW	
I	11	* N35-4018-46	BINDING HEAD MACHINE SCREW	
J	3P	* N57-2606-46	BRAZIER HEAD TAPTITE SCREW	
K	10, 1K	* N57-3006-46	BRAZIER HEAD TAPTITE SCREW	
L	2K	* N57-3010-46	BRAZIER HEAD TAPTITE SCREW	
M	21	* N57-3014-46	BRAZIER HEAD TAPTITE SCREW	
N	3A	* N57-4010-46	BRAZIER HEAD TAPTITE SCREW	
O	20	* N57-3006-45	FLAT HEAD TAPTITE SCREW	
P	2K	* N57-3006-45	BINDING HEAD TAPTITE SCREW	
Q	20	* N57-3010-45	BINDING HEAD TAPTITE SCREW	
R	2H, 21	* N90-4004-46	TP HEAD MACHINE SCREW (TRANS)	
S	20	* N90-3010-46	TP HEAD MACHINE SCREW	
T	10	* S31-2410-05	SLIDE SWITCH	VM2X
U	10	* S40-2460-05	P.S. SWITCH	
V	10	* S52-1406-05	SENSITIVE SWITCH (MIC)	
W	10	* T07-0221-05	LARGE PEAKER (FULL RANGE)	
X	10	* T91-0332-15	MICROPHONE	
Y	10	* ZSA2011A	SURGE ABSORBER	
144	15	* M02-0855-05	ENCODER (MAIN)	
145	15	* M02-0857-15	ENCODER (SUB)	
150	15, 21	* X41-3000-00	SWITCH (A) UNIT	

E: San Francisco & Europe K: USA P: Canada W: Japan

U: FR (For East, Japan) T: England M: Other Areas

UE: ADPSE (Europe) X: Australia

⚠ indicates safety critical components

PARTS LIST

2014年12月

Parts & their Part No. are as follows:

As part of our research we have published the following:

[illegible]

Ref. No.	Address	Part No.	Description	Designation
参照番号	位置	部品番号	部品名/規格	仕度備考
151	10.1	X41-3090-00	SECTOR UNIT	
152	2H.21	X42-3070-00	4V2 UNIT	
153	7C	X44-3100-00	RF UNIT	
154	2H	X45-3030-00	ANAL. UNIT	
155	4F	X46-3050-01	DIGITAL UNIT	CP
156	2F	X46-3050-02	DIGITAL UNIT	H
157	2F	X46-3050-01	DIGITAL UNIT	M
158	2F	X46-3050-02	DIGITAL UNIT	M2
159	7F	X46-3050-01	DIGITAL UNIT	A
160	7C	X48-3060-00	IF UNIT	
161	2F	X49-3020-00	AF UNIT	
162	1F	X50-3010-00	FL UNIT	
163	1C	X50-3110-00	CAR. UNIT	
164	1C	X50-3110-01	CAR. UNIT	
165		X51-3050-00	FILTER UNIT (VG-4550-1)	
166	2H	X51-3050-01	FILTER UNIT	4HWP
167	2H	X51-3060-01	FILTER UNIT	4HWP
168	2H	X51-3050-01	FILTER UNIT	M2
169	2H	X51-3060-02	FILTER UNIT	M2
170		X51-3070-00	FILTER UNIT (VG-4550-1)	
171		X51-3080-00	FILTER UNIT (VG-4550-1)	
172	2F	X52-3230-00	CS UNIT	
173	1L	X53-3240-00	AF UNIT	
174	2B	X53-3260-00	CS UNIT	
175	1B	X54-3080-00	DISPLAY UNIT	
176	7F	X57-3380-00	SIGNAL UNIT	
SWITCH UNIT (A) (X41-3080-00)				
C1 -4		C473F9.0.02K	C-12 C	1000PF K
C5		C504E4.0.00V	ELECTRO	14KV
C6		C304E4.0.010V	ELECTRO	1.0UF 50V
C7		C504E4.0.030V	ELECTRO	33UF 16KV
C8 -10		C473F9.0.02K	C-12 C	1000PF K
C11		C504E4.0.00V	ELECTRO	10KV 50KV
C12 -15		C473F9.0.03K	C-12 C	1.0UF K
C16		C504E4.0.022V	ELECTRO	22UF 16KV
C17 -20		C473F9.0.03K	C-12 C	1.0UF K
C21		C504E4.0.022V	ELECTRO	22UF 16KV
C22 -25		C473F9.0.03K	C-12 C	1.0UF K
C26 -28		C473F9.0.03K	C-12 C	1.0UF K
C29		C473F9.0.03K	C-12 C	1.0UF K
C30		C473F9.0.03K	C-12 C	1.0UF K
C31		C473F9.0.03K	C-12 C	1.0UF K
C32 -34		C473F9.0.03K	C-12 C	1.0UF K
C35 -36		C473F9.0.03K	C-12 C	1.0UF K
C41		E23-0401-05	TERMINAL	
C42		E40-3233-05	PIN CONNECTOR 5P 4-1	
C43		E40-5133-05	PIN CONNECTOR 20P	
C44		E40-3233-05	PIN CONNECTOR 3-1	
C45		E40-3240-05	PIN CONNECTOR 5P	
C46		E40-3233-05	PIN CONNECTOR 2-1	
C47		E40-5133-05	PIN CONNECTOR 10P	
C48		E40-3233-05	PIN CONNECTOR 3-1	
C49		E23-0401-05	TERMINAL	
C50		E40-3233-05	PIN CONNECTOR 2-1	

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DE AFSLEIDING 2 Augustus

▲ Pointe à la Pêche

PARTS LIST

Notes: Parts

units without Part No are not included.

as are those not mentioned in the Parts No. for the unit.

To obtain Parts No. enter from column:

Ref. No.	Address	Part No.	Description	Desti- Re-
参照番号	位置	部品番号	部品名 / 規格	仕 向 番号
S39 .40		S40-428-05	P.S. SWITCH (3, 4, 5, 6, 7, 8, 9)	
S41 .43		S40-429-05	P.S. SWITCH (3, 4, 5, 6, 7, 8, 9)	
S44 .45		S40-428-05	P.S. SWITCH (3, 4, 5, 6, 7, 8, 9)	
S46 .42		S40-2440-15	P.S. SWITCH (MAN. / AUTO. CAL)	
S53 .55		S40-2440-15	P.S. SWITCH (3, 4, 5, 6, 7, 8, 9)	
S56 .57		S40-2440-15	P.S. SWITCH (3, 4, 5, 6, 7, 8, 9)	
S58 .58		S40-2440-15	P.S. SWITCH (3, 4, 5, 6, 7, 8, 9)	
S59 .59		S40-2440-15	P.S. SWITCH (3, 4, 5, 6, 7, 8, 9)	
S62 .63		S31-2416-05	SLIDE SWITCH (MAN. / AUTO. CAL)	
D1 .7		RL373	C-17 2.60E	
D8 .9		LMC-2010-20	LED (4.7, 1.5T, 0.5)	
D10		LMC-4010	LED (4.7, 1.5T, 0.5)	
D11		LMC-2010	LED (4.7, 1.5T, 0.5)	
D12		RL373	C-17 2.60E	
D13		RL373	C-17 2.60E	
D14		RL373	C-17 2.60E	
D15		RL373	C-17 2.60E	
D16		RL373	C-17 2.60E	
D17		RL373	C-17 2.60E	
D18		RL373	C-17 2.60E	
D19		RL373	C-17 2.60E	
D20		RL373	C-17 2.60E	
D21		RL373	C-17 2.60E	
D22		RL373	C-17 2.60E	
D23		RL373	C-17 2.60E	
D24		RL373	C-17 2.60E	
D25		RL373	C-17 2.60E	
D26		RL373	C-17 2.60E	
D27		RL373	C-17 2.60E	
D28		RL373	C-17 2.60E	
D29		RL373	C-17 2.60E	
D30		RL373	C-17 2.60E	
D31		RL373	C-17 2.60E	
D32		RL373	C-17 2.60E	
D33		RL373	C-17 2.60E	
D34		RL373	C-17 2.60E	
D35		RL373	C-17 2.60E	
D36		RL373	C-17 2.60E	
D37		RL373	C-17 2.60E	
D38		RL373	C-17 2.60E	
D39		RL373	C-17 2.60E	
D40		RL373	C-17 2.60E	
D41		RL373	C-17 2.60E	
D42		RL373	C-17 2.60E	
D43		RL373	C-17 2.60E	
D44		RL373	C-17 2.60E	
D45		RL373	C-17 2.60E	
D46		RL373	C-17 2.60E	
D47		RL373	C-17 2.60E	
D48		RL373	C-17 2.60E	
D49		RL373	C-17 2.60E	
D50		RL373	C-17 2.60E	
D51		RL373	C-17 2.60E	
D52		RL373	C-17 2.60E	
D53		RL373	C-17 2.60E	
D54		RL373	C-17 2.60E	
D55		RL373	C-17 2.60E	
D56		RL373	C-17 2.60E	
D57		RL373	C-17 2.60E	
D58		RL373	C-17 2.60E	
D59		RL373	C-17 2.60E	
D60		RL373	C-17 2.60E	
D61		RL373	C-17 2.60E	
D62		RL373	C-17 2.60E	
D63		RL373	C-17 2.60E	
D64		RL373	C-17 2.60E	
D65		RL373	C-17 2.60E	
D66		RL373	C-17 2.60E	
D67		RL373	C-17 2.60E	
D68		RL373	C-17 2.60E	
D69		RL373	C-17 2.60E	
D70		RL373	C-17 2.60E	
D71		RL373	C-17 2.60E	
D72		RL373	C-17 2.60E	
D73		RL373	C-17 2.60E	
D74		RL373	C-17 2.60E	
D75		RL373	C-17 2.60E	
D76		RL373	C-17 2.60E	
D77		RL373	C-17 2.60E	
D78		RL373	C-17 2.60E	
D79		RL373	C-17 2.60E	
D80		RL373	C-17 2.60E	
D81		RL373	C-17 2.60E	
D82		RL373	C-17 2.60E	
D83		RL373	C-17 2.60E	
D84		RL373	C-17 2.60E	
D85		RL373	C-17 2.60E	
D86		RL373	C-17 2.60E	
D87		RL373	C-17 2.60E	
D88		RL373	C-17 2.60E	
D89		RL373	C-17 2.60E	
D90		RL373	C-17 2.60E	
D91		RL373	C-17 2.60E	
D92		RL373	C-17 2.60E	
D93		RL373	C-17 2.60E	
D94		RL373	C-17 2.60E	
D95		RL373	C-17 2.60E	
D96		RL373	C-17 2.60E	
D97		RL373	C-17 2.60E	
D98		RL373	C-17 2.60E	
D99		RL373	C-17 2.60E	
D100		RL373	C-17 2.60E	

Standard & Europe U.S.A. Canada Europe

U.S.A. & Europe U.S.A. & Europe U.S.A. & Europe

U.S.A. & Europe U.S.A. & Europe U.S.A. & Europe

indicates safety critical components

PARTS LIST

* New Parts

* For Extra Parts No. 9101 is listed

* For Extra Parts No. 9101 is listed

* For Extra Parts No. 9101 is listed

Ref. No.	Address No.	Parts No.	Description	Desti- nation	Re- marks
参照番号	仕 配 番 号	部 品 番 号	部 品 名 / 規 格	仕 配 場 所	
VR1 -9		3.2-1085-05	TUNING POT. 2.2K(500P) TUNE		
S1		* S25-144-05	STATOR SA-10-1(ATT)		
S2		* S29-1442-05	ROTARY SWITCH-40C		
S3		* M02-0858-05	MODERATOR T/X/T		
S4		* M02-0859-05	EXCITER M.C.-750 CH		
AVR UNIT (X43-3070-01)					
C1		* CK73EF1H2242	C-12 C	0.22UF	Z
C2		* CK73EF1H2242	C-12 C	0.22UF	Z
C3 -4		* C90-2-10-05	ELECTR9	500UF	35v
C4		* CK73EF1H1042	C-12 C	0.10UF	Z
C5		CK73EF1E4-32	CHIP C	0.047UF	Z
C7 -8		CK73EF1H1072	CHIP C	0.010UF	Z
C9		CK73EF1H1072	CHIP C	100PF	K
C10		* C90-2-09-05	ELECTR9	400UF	25v
C11		CK73EF1H2242	CHIP C	0.22UF	Z
C12		CE04EV1E4-7	ELECTR6	470UF	25v
C13		CK73EF1H1032	C-12 C	0.010UF	Z
C14 -16		CE04EV1E4-7	ELECTR6	100UF	25v
C17 -22		CK73EF1E1042	C-12 C	0.10UF	Z
C23 -25		CE04EV1E4-7	ELECTR6	100UF	25v
C26 -29		CK45E2-103P	CERAMIC	0.010UF	P
C30		* C90-2111-05	ELECTR9	100UF	80v
C31		CK45E2-103P	CERAMIC	0.010UF	P
C32 -33		CK73EF1H1032	C-12 C	0.010UF	Z
C34		CE04EV1E4-7	ELECTR6	10UF	50v
C35 -38		CK73EF1H2242	CHIP C	0.22UF	Z
C39		CE04EV1E4-7	ELECTR6	100UF	25v
C40		CK73EF1H1042	CHIP C	0.10UF	Z
C41		CK73EF1H2242	C-12 C	220PF	K
C42		CK73EF1H2242	CHIP C	0.47UF	Z
C43		CE04EV1E4-7	ELECTR6	470UF	50v
C44		C90-0547-05	CERAMIC	0.010UF	P
C45 -46		C90-1045-05	CERAMIC	470PF	K
C47 -54		CK45E2H103P	CERAMIC	0.010UF	P
C55 -52		CK73EF1H2242	CHIP C	0.22UF	Z
C63 -65		CK73EF1H1032	C-12 C	0.010UF	Z
C66		C90-2111-05	ELECTR9	2200UF	10v
C67		CK45E2-103P	CERAMIC	0.010UF	P
C68		C90-2111-05	ELECTR9	2200UF	35v
C69 -70		CK73EF1H2242	CHIP C	0.010UF	Z
C71		CE04EV1E4-7	ELECTR6	10UF	50v
C72		CK73EF1H2242	CHIP C	0.010UF	Z
C73		E23-0149-05	TERMINAL		
C74		E23-0150-05	TERMINAL		
C75		E23-0151-05	TERMINAL		
C76		E40-3230-05	PIN CONNECTOR-3P		
C77		E40-3231-05	PIN CONNECTOR-2P		
C78		E40-3232-05	PIN CONNECTOR-3P		
C79		E40-3233-05	PIN CONNECTOR-3P		
C80		E40-3234-05	PIN CONNECTOR-3P		
C81		E40-3235-05	PIN CONNECTOR-3P		
C82		E40-3236-05	PIN CONNECTOR-3P		
C83		E40-3237-05	PIN CONNECTOR-3P		
C84		E40-3238-05	PIN CONNECTOR-3P		
C85		E40-3239-05	PIN CONNECTOR-3P		
C86		E40-3240-05	PIN CONNECTOR-3P		
C87		E40-3241-05	PIN CONNECTOR-3P		
C88		E40-3242-05	PIN CONNECTOR-3P		
C89		E40-3243-05	PIN CONNECTOR-3P		
C90		E40-3244-05	PIN CONNECTOR-3P		

E: Solid State & Europe C: USA P: Canada M: Japan

L: For Extra Parts No. 9101 is listed M: Other Parts

JE: JAFSE (Japan) I: Asian

A: Always safety critical components

PARTS LIST

New Parts

Parts without Parts No. are not supplied

Les articles dont les références dans le Parts No. ne sont pas fournies

Teil ohne Parts No. werden nicht geliefert

Ref. No.	Address	Part No.	Description	Designation	Remarks
参照番号	位置	部品番号	部品名/記号	仕向番号	
CN9, 10		E40-0470-05	PIN (CMN-CTS)-4P		
CN1		E40-3233-05	PIN (CMN-CTS)-6P		
CN2		E40-1217-05	PIN (CMN-CTS)-2P		
CN13		E40-0442-05	PIN (CMN-CTS)-4P		
CN14		E40-3238-05	PIN (CMN-CTS)-3P		
CN15		E23-0401-05	TERMINAL		
CN16		E23-0457-05	TERMINAL		
F1		F05-7521-05	FUSE 1/2 5A		
		G.1-2924-04	CUSHION		
		J.3-7055-05	FUSE HOLDER (TPMS 1ST STAGE)		
		J.3-7410-05	FUSE HOLDER (TPMS 2ND STAGE)		
P1		45144B12P2J	FL-POWER RS 2.2	J	1a
P2	-3	RK73FB22XKJ	CHIP R		
P4		45144B2F151J	FL-POWER RS 150	J	3a
P5	16	RK73FB22XKJ	CHIP R		1/10W
P7		45144B2F161J	FL-POWER RS 30	J	3a
P8	-10	RK73FB22XKJ	CHIP R		
P11		45144B1A22J	FL-POWER RS 82	J	1a
P12		RE.4B2236J	RD		1/4W
P13		45144B1A22J	FL-POWER RS 2.2	J	1a
P14		RK73FB2222J	CHIP R		1/8W
P15		45144B3F103J	FL-POWER RS 10K	J	3a
P16		RS.4K33F10J	FL-POWER RS 10	J	1W
P17		45144B3B100J	FL-POWER RS 10	J	2a
P19	-23	RK73FB22XKJ	CHIP R		
P24	-103	RK73FB22XKJ	CHIP R		
P104		RS.4K33F10J	RS	15	3W
P105		RS.4K33F10J	RS	15	3W
P11		R12-D105-05	TRANSISTOR SET (12.5V 1W)		
S1		S59-1412-05	TERMINAL SWITCH (60°C)		
S2		S59-1412-05	TERMINAL SWITCH (60°C)		
D1		PL373	CHIP ZENER DIODE (0.5W)		
D2		PL373	CHIP ZENER DIODE (0.5W)		
D3		PL373	CHIP ZENER DIODE (0.5W)		
D4		PL373	CHIP ZENER DIODE (0.5W)		
D5	16	PL373	CHIP ZENER DIODE (0.5W)		
D7	18	PL373	CHIP ZENER DIODE (0.5W)		
D9		PL373	CHIP ZENER DIODE (0.5W)		
D10		PL373	CHIP ZENER DIODE (0.5W)		
D11		PL373	CHIP ZENER DIODE (0.5W)		
D12		PL373	CHIP ZENER DIODE (0.5W)		
D103		SP80247	THYRISTOR		
IC1	-3	PC7907H	VOLTAGE REGULATOR (-5V)		
IC4		PC7912H	VOLTAGE REGULATOR (-12V)		
Q1		2S394 (2)	TRANSISTOR		
Q2		2S3907 (3)	TRANSISTOR		
Q3		2S394 (2)	TRANSISTOR		
Q4		2S3907 (3)	TRANSISTOR		
Q5		2S394 (2)	TRANSISTOR		
Q6		2S3907 (3)	TRANSISTOR		
Q7		2S394 (2)	TRANSISTOR		
Q8		2S3907 (3)	TRANSISTOR		
Q9		2S394 (2)	TRANSISTOR		
Q10		2S3907 (3)	TRANSISTOR		
Q11		2S394 (2)	TRANSISTOR		
Q12		2S3907 (3)	TRANSISTOR		

E: Scandinavia & Europe USA F: Japan WE: Asia

U: Other (Excl. Japan) T: Europe M: Other Areas

JE: AA-Europe JE: AA-Europe

Indicates safety critical components

PARTS LIST

* New Parts

Part 3 with Parts No. are not justified

Les articles non mentionnés dans le Parts No. ne sont pas fournis
elle dans Parts No. ne sont pas fournis.

Ref. No.	Address	Parts No.	Description	Designation
参照番号	位置	部品番号	部品名/記号	位置
RF UNIT (X44-3100-00)				
C-3		CK73F2.2E1042	CHIP C	2.2E1042
C4		CK73F2.2E1042	CHIP C	1000PF
C5		CK73F2.2E1042	CHIP C	0.10UF
C6		CK73F2.2E1042	CHIP C	100PF
C7		CK73F2.2E1042	CHIP C	100PF
C8		CK73F2.2E1042	CHIP C	100PF
C9		CK73F2.2E1042	CHIP C	100PF
C10		CK73F2.2E1042	CHIP C	100PF
C11		CK73F2.2E1042	CHIP C	100PF
C12		CK73F2.2E1042	CHIP C	100PF
C13		CK73F2.2E1042	CHIP C	100PF
C14		CK73F2.2E1042	CHIP C	100PF
C15		CK73F2.2E1042	CHIP C	100PF
C16		CK73F2.2E1042	CHIP C	100PF
C17		CK73F2.2E1042	CHIP C	100PF
C18		CK73F2.2E1042	CHIP C	100PF
C19		CK73F2.2E1042	CHIP C	100PF
C20		CK73F2.2E1042	CHIP C	100PF
C21		CK73F2.2E1042	CHIP C	100PF
C22		CK73F2.2E1042	CHIP C	100PF
C23		CK73F2.2E1042	CHIP C	100PF
C24		CK73F2.2E1042	CHIP C	100PF
C25		CK73F2.2E1042	CHIP C	100PF
C26		CK73F2.2E1042	CHIP C	100PF
C27		CK73F2.2E1042	CHIP C	100PF
C28		CK73F2.2E1042	CHIP C	100PF
C29		CK73F2.2E1042	CHIP C	100PF
C30		CK73F2.2E1042	CHIP C	100PF
C31		CK73F2.2E1042	CHIP C	100PF
C32		CK73F2.2E1042	CHIP C	100PF
C33		CK73F2.2E1042	CHIP C	100PF
C34		CK73F2.2E1042	CHIP C	100PF
C35		CK73F2.2E1042	CHIP C	100PF
C36		CK73F2.2E1042	CHIP C	100PF
C37		CK73F2.2E1042	CHIP C	100PF
C38		CK73F2.2E1042	CHIP C	100PF
C39		CK73F2.2E1042	CHIP C	100PF
C40		CK73F2.2E1042	CHIP C	100PF
C41		CK73F2.2E1042	CHIP C	100PF
C42		CK73F2.2E1042	CHIP C	100PF
C43		CK73F2.2E1042	CHIP C	100PF
C44		CK73F2.2E1042	CHIP C	100PF
C45		CK73F2.2E1042	CHIP C	100PF
C46		CK73F2.2E1042	CHIP C	100PF
C47		CK73F2.2E1042	CHIP C	100PF
C48		CK73F2.2E1042	CHIP C	100PF
C49		CK73F2.2E1042	CHIP C	100PF
C50		CK73F2.2E1042	CHIP C	100PF
C51		CK73F2.2E1042	CHIP C	100PF
C52		CK73F2.2E1042	CHIP C	100PF
C53		CK73F2.2E1042	CHIP C	100PF
C54		CK73F2.2E1042	CHIP C	100PF
C55		CK73F2.2E1042	CHIP C	100PF
C56		CK73F2.2E1042	CHIP C	100PF
C57		CK73F2.2E1042	CHIP C	100PF
C58		CK73F2.2E1042	CHIP C	100PF
C59		CK73F2.2E1042	CHIP C	100PF
C60		CK73F2.2E1042	CHIP C	100PF
C61		CK73F2.2E1042	CHIP C	100PF
C62		CK73F2.2E1042	CHIP C	100PF
C63		CK73F2.2E1042	CHIP C	100PF
C64		CK73F2.2E1042	CHIP C	100PF
C65		CK73F2.2E1042	CHIP C	100PF
C66		CK73F2.2E1042	CHIP C	100PF
C67		CK73F2.2E1042	CHIP C	100PF
C68		CK73F2.2E1042	CHIP C	100PF
C69		CK73F2.2E1042	CHIP C	100PF
C70		CK73F2.2E1042	CHIP C	100PF
C71		CK73F2.2E1042	CHIP C	100PF
C72		CK73F2.2E1042	CHIP C	100PF
C73		CK73F2.2E1042	CHIP C	100PF
C74		CK73F2.2E1042	CHIP C	100PF
C75		CK73F2.2E1042	CHIP C	100PF

E: Standard & Europe R: Asia P: Canada M: Japan

L: FRG Ex: East & West T: England M: Other Areas

UE: AAFS/Europe X: Unknown

A: indicates safety critical components

PARTS LIST

Refer Parts

Parts with * Parts No. are not supplied

Les articles non mentionnés dans le Parts No. ne sont pas fournis

*elle ohne Parts No. werden nicht geliefert

Ref. No.	Address New Parts	Parts No.	Description	Desti- Re- nation marks
参照番号	位置番	部品番号	部品名/規格	仕向番号
C16		CK73FF1E104Z	CHIP C	0.10.F Z
C19		CE04EWIC220M	ELECTR9	22UF 16WV
C60		CK73FF1E104Z	CHIP C	0.10.F Z
C81		CC73FSL1H221J	CHIP C	22UF 16WV
C82 .81		CC73FCH1H180J	CHIP C	18UF 16WV
C84		CK73FF1E104Z	CHIP C	0.10.F Z
C85		CE04EWIC220M	ELECTR9	22UF 16WV
C86		CK73FF1E104Z	CHIP C	0.10.F Z
C87		CC73FSL1H221J	CHIP C	22UF 16WV
C88		CC73FCH1H180J	CHIP C	18UF 16WV
C90		CK73FF1E104Z	CHIP C	0.10.F Z
C91		CE04EWIC220M	ELECTR9	22UF 16WV
C92		CK73FF1E104Z	CHIP C	0.10.F Z
C93		CC73FSL1H221J	CHIP C	22UF 16WV
C94		CC73FCH1H180J	CHIP C	18UF 16WV
C96		CK73FF1E104Z	CHIP C	0.10.F Z
C97		CE04EWIC220M	ELECTR9	22UF 16WV
C98		CK73FF1E104Z	CHIP C	0.10.F Z
C99		CC73FSL1H221J	CHIP C	22UF 16WV
C100		CC73FCH1H180J	CHIP C	18UF 16WV
C101		CK73FF1E104Z	CHIP C	0.10.F Z
C102		CE04EWIC220M	ELECTR9	22UF 16WV
C103		CK73FF1E104Z	CHIP C	0.10.F Z
C104-106		CC73FCH1H180J	CHIP C	18UF 16WV
C107		CK73FF1E104Z	CHIP C	0.10.F Z
C108		CE04EWIC220M	ELECTR9	22UF 16WV
C109-111		CK73FF1E104Z	CHIP C	0.10.F Z
C112		CE04EWIC220M	ELECTR9	22UF 16WV
C113		CE04EWIC220M	ELECTR9	22UF 16WV
C114		CE04EWIC220M	ELECTR9	22UF 16WV
C115		CE04EWIC220M	ELECTR9	22UF 16WV
C116		CE04EWIC220M	ELECTR9	22UF 16WV
C117		CE04EWIC220M	ELECTR9	22UF 16WV
C118		CE04EWIC220M	ELECTR9	22UF 16WV
C119		CE04EWIC220M	ELECTR9	22UF 16WV
C120		CE04EWIC220M	ELECTR9	22UF 16WV
C121		CE04EWIC220M	ELECTR9	22UF 16WV
C122		CK73FF1E104Z	CHIP C	0.10.F Z
C123		CE04EWIC220M	ELECTR9	22UF 16WV
C124 .25		CK73FF1E104Z	CHIP C	0.10.F Z
C125		CE04EWIC220M	ELECTR9	22UF 16WV
C126		CK73FF1E104Z	CHIP C	0.10.F Z
C127		CE04EWIC220M	ELECTR9	22UF 16WV
C128		CK73FF1E104Z	CHIP C	0.10.F Z
C129 .31		CE04EWIC220M	ELECTR9	22UF 16WV
C130		CK73FF1E104Z	CHIP C	0.10.F Z
C131		CE04EWIC220M	ELECTR9	22UF 16WV
C132		CK73FF1E104Z	CHIP C	0.10.F Z
C133 .35		CE04EWIC220M	ELECTR9	22UF 16WV
C134-136		CK73FF1E104Z	CHIP C	0.10.F Z
C137-141		CK73FF1E104Z	CHIP C	0.10.F Z
C142-143		CK73FF1E104Z	CHIP C	0.10.F Z
C144		CC73FSL1H151J	CHIP C	15UF 16WV
C145-146		CK73FF1E104Z	CHIP C	0.10.F Z
C147 .49		CK73FF1E104Z	CHIP C	0.10.F Z
C150		CE04EWIC220M	ELECTR9	22UF 16WV
C151 153		CK73FF1E104Z	CHIP C	0.10.F Z
C154		CK73FF1E104Z	CHIP C	0.10.F Z
C155		CK73FF1E104Z	CHIP C	0.10.F Z
C156		CK73FF1E104Z	CHIP C	0.10.F Z
C157 .61		CC73FCH1H180J	CHIP C	18UF 16WV
C158 .65		CK73FF1E104Z	CHIP C	0.10.F Z
C159 .68		CK73FF1E104Z	CHIP C	0.10.F Z
C160 .70		CK73FF1E104Z	CHIP C	0.10.F Z
C161		CC73FSL1H151J	CHIP C	15UF 16WV
C162 .73		CC73FCH1H180J	CHIP C	18UF 16WV

E Scandinavia & Europe K USA F Japan W Europe

U Africa East, India T Japan M Other Areas

U Africa East, India T Japan M Other Areas

U Africa East, India T Japan M Other Areas

PARTS LIST

e New Parts

Parts without Parts No. are not supplied

Les pièces sans numéro de pièce ne sont pas fournies

Teile ohne Parts No. werden nicht geliefert

Ref. No. 参照番号	Address 位置	Parts No. 部品番号	Description 部品名/規格	Desti- nation 仕向	Re- marks 備考
C174		CEC4EW-0220*	ELECTR	22-F	1.5Vv
C175-177		CK73FE1E1042	CHIP C	0.10F	Z
C179-185		CK73FE-1334	CHIP C		
C186-187		CC73FC-1H2KXC	CHIP C		
C188-189		CK73FE-1.042	CHIP C	0.10.F	Z
C190		CK73FB1H1024	CHIP C	1020PF	K
C191		CK73FE-1.042	C-12 C	0.10.F	Z
C192		CK73FB1H1024	CHIP C	1020PF	K
C193		C304Ea-010P	ELECTR	10F	50Vv
C194-194		CK73FE-1.042	CHIP C	0.10.F	Z
C197, 198		CK73FB1H102K	C-12 C	1020PF	K
C199		CK73FE-1.042	CHIP C	0.10.F	K
C200		CK73FE1E1042	C-12 C	0.10.F	Z
C201		CK73FE-1.042	CHIP C	0.10.F	K
C203		CC73FCH-1320J	C-12 C	33PF	J
C204-209		CC73FSLIMXXJ	CHIP C		
C204, 207		CK73FE1E102K	C-12 C	0.010UF	K
C209-209		CC73FSLIMXXJ	CHIP C		
C210		CK73FE1E1042	CHIP C	0.10UF	Z
C211		CC73FCHIM460J	C-12 C	60PF	J
C212, 213		CK73FE1E102K	CHIP C	0.010UF	K
C214-216		CC73FCHIMXXJ	C-12 C		
C219, 220		CK73FE1E102K	CHIP C	0.010UF	K
C221-225		CK73FE1E1042	C-12 C	0.10.F	Z
C222		CK73FE1E102K	CHIP C	0.010UF	K
C226, 227		CK73FE1E1042	C-12 C	0.10.F	Z
C228-230		CC73FC-1334	CHIP C		
C232-234		CK73FE1E102K	C-12 C		
C235, 236		CC73FC-1600J	CHIP C	60PF	J
C237		CK73FE1E102K	C-12 C	0.010UF	K
C238		CK73FE1E1042	CHIP C	0.10UF	Z
C239		CK73FE1E102K	C-12 C	0.010UF	K
C240		CK73FE-1.042	CHIP C	0.10UF	Z
C241		CK73FE1E102K	C-12 C	0.010UF	K
C242		CC45CH-1220J	CERAMIC C	22PF	J
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PARTS LIST

■ New Parts

Parts without Parts No. are not supplied

Les articles dont le numéro de partie n'est pas fourni

Teil ohne Parts No. werden nicht geliefert

Ref. No.	Address	New Parts	Parts No.	Description	Dist. Re- net-on Parts
参照番号	位置	新 部 品	部品番号	部品名/記号	仕 向 備考
L11, 12			L40-101-14	SMALL FIXED INDUCTOR(100UH)	
L13		*	L40-8201-14	SMALL FIXED INDUCTOR(820UH)	
L14			L40-470-14	SMALL FIXED INDUCTOR(47UH)	
L15			L40-5601-14	SMALL FIXED INDUCTOR(560UH)	
L16			L40-8291-14	SMALL FIXED INDUCTOR(8.2UH)	
L17			L40-150-14	SMALL FIXED INDUCTOR(15UH)	
L18			L40-8291-14	SMALL FIXED INDUCTOR(8.2UH)	
L19		*	L34-4.64-05	COIL(B.P.F 3-4MHZ) 4.7UH	
L20		*	L34-4176-05	COIL(B.P.F 3-4MHZ) 15UH	
L21		*	L34-4.64-05	COIL(B.P.F 3-4MHZ) 4.7UH	
L22			L40-3191-14	SMALL FIXED INDUCTOR(3.19UH)	
L23			L40-6891-14	SMALL FIXED INDUCTOR(6.8UH)	
L24			L40-3191-14	SMALL FIXED INDUCTOR(3.19UH)	
L25		*	L34-4146-05	COIL(B.P.F 7-7.5MHZ) 0.82UH	
L26		*	L34-4178-05	COIL(B.P.F 7-7.5MHZ) 18UH	
L27		*	L34-4146-05	COIL(B.P.F 7-7.5MHZ) 0.82UH	
L28			L40-1292-14	SMALL FIXED INDUCTOR(1.2UH)	
L29			L40-6391-14	SMALL FIXED INDUCTOR(6.3UH)	
L30			L40-1292-14	SMALL FIXED INDUCTOR(1.2UH)	
L31		*	L34-4140-05	COIL(B.P.F 10-10.5MHZ) 0.47UH	
L32		*	L34-4.75-05	COIL(B.P.F 10-10.5MHZ) 13UH	
L33		*	L34-4.40-05	COIL(B.P.F 10-10.5MHZ) 0.47UH	
L34			L40-8282-14	SMALL FIXED INDUCTOR(0.82UH)	
L35			L40-5601-14	SMALL FIXED INDUCTOR(5.6UH)	
L36			L40-8282-14	SMALL FIXED INDUCTOR(0.82UH)	
L37		*	L34-4.36-05	COIL(B.P.F 14-14.5MHZ) 0.33UH	
L38		*	L34-4172-05	COIL(B.P.F 14-14.5MHZ) 10UH	
L39		*	L34-4.36-05	COIL(B.P.F 14-14.5MHZ) 0.33UH	
L40			L40-4782-14	SMALL FIXED INDUCTOR(4.7UH)	
L41			L40-5691-14	SMALL FIXED INDUCTOR(5.6UH)	
L42			L40-3982-14	SMALL FIXED INDUCTOR(3.9UH)	
L43			L40-3382-14	SMALL FIXED INDUCTOR(3.3UH)	
L44			L40-5691-14	SMALL FIXED INDUCTOR(5.6UH)	
L45			L40-2782-14	SMALL FIXED INDUCTOR(2.7UH)	
L46		*	L34-4.72-05	COIL(B.P.F 21-21.5MHZ) 0.22UH	
L47		*	L34-4166-05	COIL(B.P.F 21-21.5MHZ) 4.7UH	
L48		*	L34-4.72-05	COIL(B.P.F 21-21.5MHZ) 0.22UH	
L49			L40-2782-14	SMALL FIXED INDUCTOR(2.7UH)	
L50			L40-5691-14	SMALL FIXED INDUCTOR(5.6UH)	
L51			L40-2282-14	SMALL FIXED INDUCTOR(2.2UH)	
L52		*	L34-4192-05	COIL(B.P.F 24.5-30MHZ)	
L53		*	L34-4.93-05	COIL(B.P.F 24.5-30MHZ)	
L54		*	L34-4194-05	COIL(B.P.F 24.5-30MHZ)	
L55, 56			L40-4711-14	SMALL FIXED INDUCTOR(470UH)	
L57-59			L40-1021-14	SMALL FIXED INDUCTOR(1UH)	
L60, 61			L19-0324-05	BALUN TRANSFORMER	
L62			L40-1021-14	SMALL FIXED INDUCTOR(1UH)	
L63			L19-0324-05	BALUN TRANSFORMER	
L64			L40-1021-14	SMALL FIXED INDUCTOR(1UH)	
L65			L19-0324-05	BALUN TRANSFORMER	
L66			L40-4782-14	SMALL FIXED INDUCTOR(4.7UH)	
L67			L40-1021-14	SMALL FIXED INDUCTOR(1UH)	
L68			L34-4046-05	COIL	
L69			L34-0895-05	COIL	
L70			L19-0344-05	BALUN TRANSFORMER	

E: Send Orders & Enquiries E: USA P: Canada W: Europe

L: FAX/Far East Areas T: Telexed M: Other Areas

US: AAF SE: Europe X: Australia

▲ includes safety critical components

PARTS LIST

New Parts

Parts without Parts No. are not supplied

as articles mentioned comes from the Parts No. to which they belong

To the Parts No. are added the following

Ref. No. 参照番号	Address 番 号	Parts No. 部 品 番 号	Description 部 品 名 / 規 格	Dist. No. 販 賣 部 番 号
L71		L40-1021-14	SMALL FIXED INDUCTOR(1M)	
L72		L40-1752-4	SMALL FIXED INDUCTOR(0.270M)	
L73		L40-2232-14	SMALL FIXED INDUCTOR(0.22M)	
L74		L40-1021-14	SMALL FIXED INDUCTOR(1M)	
L75		L19-0324-05	BALUN TRANSFORMER	
L76		L40-1501-14	SMALL FIXED INDUCTOR(10M)	
L77		L24-2267-05	COIL(SUB IFT)	
L78		L34-4043-05	COIL(SUB IFT)	
L79		L24-4049-05	COIL(SUB IFT)	
L80		L24-4043-05	COIL(SUB IFT)	
L81		L39-0454-05	TRIAL COIL	
L82	83	L40-1021-14	SMALL FIXED INDUCTOR(1M)	
L84		L40-2232-14	SMALL FIXED INDUCTOR(0.22M)	
L85		L40-2262-14	SMALL FIXED INDUCTOR(0.22M)	
L86		L19-0324-05	BALUN TRANSFORMER	
L87		L34-4222-05	COIL(SUB IFT)	
L88		L40-4091-14	SMALL FIXED INDUCTOR(4.7M)	
L89		L39-0454-05	TRIAL COIL	
L90		L39-0454-05	TRIAL COIL	
L91	92	L39-0454-05	TRIAL COIL	
L93		L24-4211-05	COIL(SUB IFT)	
L94	95	L24-4190-05	COIL(SUB IFT)	
L96		L40-1021-14	SMALL FIXED INDUCTOR(1M)	
L97		L40-2232-14	SMALL FIXED INDUCTOR(0.22M)	
L98		L40-2232-14	SMALL FIXED INDUCTOR(0.22M)	
L99		L40-1502-17	SMALL FIXED INDUCTOR(1.5M)	
L100		L40-1502-17	SMALL FIXED INDUCTOR(1.5M)	
L101		L40-1502-17	SMALL FIXED INDUCTOR(1.5M)	
L102-104		L40-6082-17	SMALL FIXED INDUCTOR(0.60M)	
L105		L40-1021-14	SMALL FIXED INDUCTOR(1M)	
L106		L40-6082-17	SMALL FIXED INDUCTOR(0.60M)	
L107		L40-4091-14	SMALL FIXED INDUCTOR(4.7M)	
L108		L39-0432-05	TRIAL COIL	
L109		L40-1021-14	SMALL FIXED INDUCTOR(1M)	
L110		L39-0454-05	TRIAL COIL	
L11		L40-1021-14	SMALL FIXED INDUCTOR(1M)	
L112-114		L40-2232-14	SMALL FIXED INDUCTOR(0.22M)	
RF1		L71-0275-05	CRYSTAL FILTER(40.055MHZ)	
R1	84	R473F324XXJ	CHIP R	
R25		R0148B20560J	R	56 1 1/6W
R36	87	R473F324XXJ	CHIP R	
R168		R0148B20560J	R	56 1 1/6W
VR1	2	P12-1089-05	TRIMMING POT. 4.7K	
VR3		P12-0101-05	TRIMMING POT. 47K	
VR4	6	L2-2.33-05	TRIMMING POT. 47K	
M		P92-1261-05	JUMPER RESISTOR 0.5W	
C	2	SS1-1474-05	DELAY	
D	2	LS12	CHIP D	
D3		RLZ75 15	CHIP ZENER DIODE(5.1V)	
D4	3	LS1050	CHIP D	
D5	36	RLS13	CHIP DIODE	
D57	36	NT204	DIODE	
D15		PLS13	CHIP DIODE	

E: Scandinavia & Europe E: USA F: Canada M: Europe

J: Pacific East (Japan) T: England M: Other Areas

UE: Australia S: Africa

Always safety critical components

PARTS LIST

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29-00 4th Cir. 1981. No. 90-0150 (1981).

Les art. ci-dessus mentionnés sont devenus l'œuvre de l'État par le fait de

12. **Printed Party Name:** **DEPT. OF CORRECTIONS**

Ref. No.	Address New Parts	Parts No.	Description	Desti- nation	Remarks
参照番号	位置	部品番号	部品名 / 規格	仕	向番号
340	41	7805 3	REG		
342	45	P 5135	CHIP DIODE		
346	47	RLS71	CHIP 0.190		
348	57	PLS135	CHIP DIODE		
350	60	RLS71	CHIP 0.190		
361	52	DA2024P	CHIP DIODE		
363		DSP-201A	160		
364		RLS135	CHIP DIODE		
365		ISS131	2.60E		
367	12	DA4LS14CM	IC J.A. PSND RALT.		
371	12	2SA1162CV	CHIP TRANSISTOR		
373		2SC27121Y	CHIP TRANSISTOR		
374	15	2SK125-B	FET		
376		2S1520(B43	CHIP FET		
377	16	2SK120144A	CHIP FET		
3817	19	2SC2954-GM3	CHIP TRANSISTOR		
3821	22	3SK131(7)	CHIP FET		
3823		ETC.142B	E.C.T.A. TRANSISTOR		
3824	28	JTC124EX	DIGITAL TRANSISTOR		
3829	32	ETA.142A	E.C.T.A. TRANSISTOR		
3831	35	JTA124EX	DIGITAL TRANSISTOR		
3837		2SC27121Y	CHIP TRANSISTOR		
3841		12-302-2	TRANSISTOR 2K		

FINAL UNIT DX45-2330-000

Part Number	Value	Material	Capacitance	Power Rating
C1	0.45B1H102K	CERAMIC	100PF	0
C2	0.45B1H102K	CERAMIC	100PF	0
C3	0.45B1H102K	CERAMIC	100PF	0
C4	0.45B1H102K	CERAMIC	100PF	0
C5	0.45B1H102K	CERAMIC	100PF	0
C6	0.45B1H102K	CERAMIC	100PF	0
C7	0.45B1H102K	CERAMIC	100PF	0
C8	0.45B1H102K	CERAMIC	100PF	0
C9	0.45B1H102K	CERAMIC	100PF	0
C10	0.45B1H102K	CERAMIC	100PF	0
C11	0.45B1H102K	CERAMIC	100PF	0
C12	0.45B1H102K	CERAMIC	100PF	0
C13	0.45B1H102K	CERAMIC	100PF	0
C14	0.45B1H102K	CERAMIC	100PF	0
C15	0.45B1H102K	CERAMIC	100PF	0
C16	0.45B1H102K	CERAMIC	100PF	0
C17	0.45B1H102K	CERAMIC	100PF	0
C18	0.45B1H102K	CERAMIC	100PF	0
C19	0.45B1H102K	CERAMIC	100PF	0
C20	0.45B1H102K	CERAMIC	100PF	0
C21	0.45B1H102K	CERAMIC	100PF	0
C22	0.45B1H102K	CERAMIC	100PF	0
C23	0.45B1H102K	CERAMIC	100PF	0
C24	0.45B1H102K	CERAMIC	100PF	0
C25	0.45B1H102K	CERAMIC	100PF	0
C26	0.45B1H102K	CERAMIC	100PF	0
C27	0.45B1H102K	CERAMIC	100PF	0
C28	0.45B1H102K	CERAMIC	100PF	0
C29	0.45B1H102K	CERAMIC	100PF	0
C30	0.45B1H102K	CERAMIC	100PF	0
C31	0.45B1H102K	CERAMIC	100PF	0
C32	0.45B1H102K	CERAMIC	100PF	0
C33	0.45B1H102K	CERAMIC	100PF	0
C34	0.45B1H102K	CERAMIC	100PF	0
C35	0.45B1H102K	CERAMIC	100PF	0
C36	0.45B1H102K	CERAMIC	100PF	0
C37	0.45B1H102K	CERAMIC	100PF	0
C38	0.45B1H102K	CERAMIC	100PF	0
C39	0.45B1H102K	CERAMIC	100PF	0
C40	0.45B1H102K	CERAMIC	100PF	0
C41	0.45B1H102K	CERAMIC	100PF	0
C42	0.45B1H102K	CERAMIC	100PF	0
C43	0.45B1H102K	CERAMIC	100PF	0

E. Santoro and T. G. Crone **E. Crone** **W. E. Crone**

J. D. East, Head † Eugene M. C. East, Jr.

UE 4475-540001 2-5-67-10

▲ 4월 15일 9시 30분 2019년 4월 15일

PARTS LIST

A NEW PARTS

Parts with no Part No. are to be replaced.

A dash (-) indicates that the Part No. is not to be replaced.

To replace Parts No. not shown, see page 111.

Ref. No.	Address	Part No.	Description	Destination	Remarks
参照番号	位置	部品番号	部品名/規格	仕向番号	備考
CN4		E40-3230-01	PIN CONNECTOR (3P)		
CN5		E40-3230-05	PIN CONNECTOR (3P)		
CN6		E40-3230-08	PIN CONNECTOR (3P)		
1F-12		E40-0211-05	PIN CONNECTOR (3P)		
W.		331-4070-05	CONNECTING WIRE		
201	3K	F01-1049-21	HEAT SINK		
202	4K	F29-1014-05	INSULATOR		
F		-05-1014-05	FUSE (5A)		
203	1, 2, 3	G12-0171-04	FLAT SPRING		
		J12-1055-05	WIRE HOLDER		
L1		L40-1201-14	SMALL FIXED INDUCTOR (100H)		
L2		L19-0715-05	SMALL TRANSFORMER		
L3		L39-0476-05	TRANSFORMER		
L4		L39-0477-05	TRANSFORMER		
L5		L39-0478-05	TRANSFORMER		
L6	-8	L39-0479-05	TRANSFORMER		
L7		L39-0480-05	TRANSFORMER		
L8		L40-1201-14	SMALL FIXED INDUCTOR (100H)		
L9		L39-0479-05	TRANSFORMER		
L10		L40-1201-14	SMALL FIXED INDUCTOR (100H)		
L11		L39-0479-05	TRANSFORMER		
L12	1, 3	L39-0479-05	TRANSFORMER		
L14		L39-0479-05	TRANSFORMER		
L15	-17	L39-0479-05	TRANSFORMER		
L16	-21	L40-1201-14	SMALL FIXED INDUCTOR (100H)		
L22	23	L39-0479-05	TRANSFORMER		
208	2K	N10-1040-44	FLAT WASHER		
U	23, 24	N10-1040-44	FLAT WASHER		
V	4K	N10-1040-44	FLAT WASHER		
W	4K	N10-1040-44	FLAT WASHER		
X	23, 24	N10-1040-44	FLAT WASHER		
Y		N10-1040-44	FLAT WASHER		
Z		N10-1040-44	FLAT WASHER		
1		N10-1040-44	FLAT WASHER		
2		N10-1040-44	FLAT WASHER		
3		N10-1040-44	FLAT WASHER		
4		N10-1040-44	FLAT WASHER		
5		N10-1040-44	FLAT WASHER		
6		N10-1040-44	FLAT WASHER		
7		N10-1040-44	FLAT WASHER		
8		N10-1040-44	FLAT WASHER		
9		N10-1040-44	FLAT WASHER		
10		N10-1040-44	FLAT WASHER		
11		N10-1040-44	FLAT WASHER		
12		N10-1040-44	FLAT WASHER		
13		N10-1040-44	FLAT WASHER		
14		N10-1040-44	FLAT WASHER		
15		N10-1040-44	FLAT WASHER		
16		N10-1040-44	FLAT WASHER		
17		N10-1040-44	FLAT WASHER		
18		N10-1040-44	FLAT WASHER		
19		N10-1040-44	FLAT WASHER		
20		N10-1040-44	FLAT WASHER		
21		N10-1040-44	FLAT WASHER		
22		N10-1040-44	FLAT WASHER		
23		N10-1040-44	FLAT WASHER		
24		N10-1040-44	FLAT WASHER		
25		N10-1040-44	FLAT WASHER		
26		N10-1040-44	FLAT WASHER		
27		N10-1040-44	FLAT WASHER		
28		N10-1040-44	FLAT WASHER		
29		N10-1040-44	FLAT WASHER		
30		N10-1040-44	FLAT WASHER		
31		N10-1040-44	FLAT WASHER		
32		N10-1040-44	FLAT WASHER		
33		N10-1040-44	FLAT WASHER		
34		N10-1040-44	FLAT WASHER		
35		N10-1040-44	FLAT WASHER		
36		N10-1040-44	FLAT WASHER		
37		N10-1040-44	FLAT WASHER		
38		N10-1040-44	FLAT WASHER		
39		N10-1040-44	FLAT WASHER		
40		N10-1040-44	FLAT WASHER		
41		N10-1040-44	FLAT WASHER		
42		N10-1040-44	FLAT WASHER		
43		N10-1040-44	FLAT WASHER		
44		N10-1040-44	FLAT WASHER		
45		N10-1040-44	FLAT WASHER		
46		N10-1040-44	FLAT WASHER		
47		N10-1040-44	FLAT WASHER		
48		N10-1040-44	FLAT WASHER		
49		N10-1040-44	FLAT WASHER		
50		N10-1040-44	FLAT WASHER		
51		N10-1040-44	FLAT WASHER		
52		N10-1040-44	FLAT WASHER		
53		N10-1040-44	FLAT WASHER		
54		N10-1040-44	FLAT WASHER		
55		N10-1040-44	FLAT WASHER		
56		N10-1040-44	FLAT WASHER		
57		N10-1040-44	FLAT WASHER		
58		N10-1040-44	FLAT WASHER		
59		N10-1040-44	FLAT WASHER		
60		N10-1040-44	FLAT WASHER		
61		N10-1040-44	FLAT WASHER		
62		N10-1040-44	FLAT WASHER		
63		N10-1040-44	FLAT WASHER		
64		N10-1040-44	FLAT WASHER		
65		N10-1040-44	FLAT WASHER		
66		N10-1040-44	FLAT WASHER		
67		N10-1040-44	FLAT WASHER		
68		N10-1040-44	FLAT WASHER		
69		N10-1040-44	FLAT WASHER		
70		N10-1040-44	FLAT WASHER		
71		N10-1040-44	FLAT WASHER		
72		N10-1040-44	FLAT WASHER		
73		N10-1040-44	FLAT WASHER		
74		N10-1040-44	FLAT WASHER		
75		N10-1040-44	FLAT WASHER		
76		N10-1040-44	FLAT WASHER		
77		N10-1040-44	FLAT WASHER		
78		N10-1040-44	FLAT WASHER		
79		N10-1040-44	FLAT WASHER		
80		N10-1040-44	FLAT WASHER		
81		N10-1040-44	FLAT WASHER		
82		N10-1040-44	FLAT WASHER		
83		N10-1040-44	FLAT WASHER		
84		N10-1040-44	FLAT WASHER		
85		N10-1040-44	FLAT WASHER		
86		N10-1040-44	FLAT WASHER		
87		N10-1040-44	FLAT WASHER		
88		N10-1040-44	FLAT WASHER		
89		N10-1040-44	FLAT WASHER		
90		N10-1040-44	FLAT WASHER		
91		N10-1040-44	FLAT WASHER		
92		N10-1040-44	FLAT WASHER		
93		N10-1040-44	FLAT WASHER		
94		N10-1040-44	FLAT WASHER		
95		N10-1040-44	FLAT WASHER		
96		N10-1040-44	FLAT WASHER		
97		N10-1040-44	FLAT WASHER		
98		N10-1040-44	FLAT WASHER		
99		N10-1040-44	FLAT WASHER		
100		N10-1040-44	FLAT WASHER		

E: Standard & Weight Co., Inc. F: Lancia W. E. Corp.

U: F. H. Co., Inc. T: Lancia W. E. Corp. M: General Motors

J: Lancia W. E. Corp. K: Lancia W. E. Corp.

A: Lancia W. E. Corp. B: Lancia W. E. Corp.

PARTS LIST

* NEW TO US

Parts without Part No. are not supplied.

※ 本機に付属する部品は、必ずしも本機に付属する部品とは限りません。

※ 本機に付属する部品は、必ずしも本機に付属する部品とは限りません。

Ref. No. 参照番号	Address 位置	Part No. 部品番号	Description 部品名 / 規格	Desti- Re- nation marks 仕 向 番号
R37		492-1231-05	FIXED RESISTOR 0.1 5W	
R38		492-1247-05	FIXED RESISTOR 0.1 5W	
R4 -3		492-1093-05	TRIMMER RESISTOR 0.1 5W	
R2		492-0150-05	JUMPER RESISTOR 0.1 5W	
S1		359-1413-05	THEORY SWITCH (50°C)	
S2		359-1414-05	THEORY SWITCH (70°C)	
S3		359-1415-05	THEORY SWITCH (90°C)	
T1		492-0102-05	TRANSISTOR (40°C)	
D1		MT-5F	DIODE	
D2		SV02MS	DIODE	
D4		MT24.7JC	DIODE (40°C)	
D5		S.355	DIODE	
D7		MC92	DIODE	
D8		MT26.2JC	ZENER DIODE (8.2V)	
D9		S.355	DIODE	
D10		UZP4.7B	ZENER DIODE (4.7V)	
D11		2SC1931	TRANSISTOR	
D12		2SC3.73	TRANSISTOR	
D14		MTF423HP	TRANSISTOR	
D16		2SC1404A	TRANSISTOR	
D18		2SC2922	TRANSISTOR	
D19		2SC361A	TRANSISTOR	
D20		2SC2459A	TRANSISTOR	
D21		DTC 2455	DIGITAL TRANSISTOR	
D22		DTF1437S	DIGITAL TRANSISTOR	
D23		2SA552A	TRANSISTOR	
D24		DTF124ES	DIGITAL TRANSISTOR	
D25		DTA 2455	DIGITAL TRANSISTOR	
DIGITAL UNIT (X46-3050-XX) -11:K.P -21:M -61:W -62:W2 -71:X				
C1		CK73FB1H102K	CHIP C	100PF
C3		CK73FB1E107K	CHIP C	0.010UF
C4		CK73FB1H102K	CHIP C	100PF
C6		CK73FB1E107K	CHIP C	0.010UF
C7		CK73FB1H102K	CHIP C	100PF
C11		CK73FB1E103K	CHIP C	0.001UF
C13		CEC43M1C470M	ELECTRO	47UF 16V
C14		CK73FB1E103K	CHIP C	0.001UF
C17		CEC43M1C470M	ELECTRO	47UF 16V
C18		CEC43M1C470M	ELECTRO	47UF 16V
C19		CK73FB1E107K	CHIP C	0.010UF
C26		CEC43M1C470M	ELECTRO	47UF 16V
C27		CK73FB1H471K	CHIP C	47PF
C29		CEC43M1C470M	ELECTRO	47UF 16V
C30		CK73FB1E107K	CHIP C	0.010UF
C42		CK73FB1E102K	CHIP C	100PF
C45		CK73FB1E103K	CHIP C	0.001UF
C52		CK73FB1E1042	CHIP C	0.001UF
C53		CK73FB1H102K	CHIP C	100PF
C55		CK73FB1E103K	CHIP C	0.010UF
C73		CEC43M1C470M	ELECTRO	47UF 16V
C74		CK73FB1E1042	CHIP C	0.001UF
C75		CEC43M1C470M	ELECTRO	47UF 16V
C76		CK73FB1E1042	CHIP C	0.001UF
C77		CK73FB1E103K	CHIP C	0.010UF

E Board new & Europe C175 P-Circuit W-Logic

U-Port at East Europe E-Engine M-Other parts

UE SAFETY Function X-Auxiliary

△ indicates safety critical components

PARTS LIST

* New Parts

Parts without Parts No. are not supplied

Les articles sans numéro de pièces ne sont pas fournis

Teile ohne Parts No. werden nicht geliefert

Ref. No. 参照番号	Address 位置	Parts No. 部品番号	Description 部品名/規格	Designation 仕	Remarks 備考
C78		CE43M10470*	ELECTR	470F	16V
C79		CK73-B1E107*	CHIP C	0.010.F	K
C80		CK73F3.3C4Z	CHIP C	0.10.F	Z
C81		CE44M10470*	ELECTR	47.F	16V
C82		C30-204-05	ELECTR	100F	10V
C83		CK73F3.3C4Z	CHIP C	0.10.F	Z
C84-99		CK73-B1E107*	CHIP C	0.010.F	K
C100		CE44M10470*	ELECTR	470F	16V
C101		CK73F3.3C4Z	CHIP C	0.10.F	Z
C102		CK73-B1E107*	CHIP C	0.010.F	K
C103		CK73F3.3C4Z	CHIP C	0.10.F	Z
C104-106		CK73F3.3C34	CHIP C	0.010.F	K
C107-120		CK73F81H102K	CHIP C	1000F	K
C121-142		CK73F3.3C34	CHIP C	0.10.F	Z
C143-144		CE44-M1E220M	ELECTR	220F	25V
C145-170		CK73F81E104Z	CHIP C	0.10.F	Z
C171		CK73F3.3C4Z	CHIP C	0.10.F	Z
C172-182		CK73-B1E107*	CHIP C	0.010.F	K
C183-186		CK73F3.3C4Z	CHIP C	0.10.F	Z
C189		CK73-F1E104Z	CHIP C	0.10.F	Z
C191		CK73F3.3C34	CHIP C	0.010.F	K
C191-203		CK73F3.3C4Z	CHIP C	0.10.F	K
C204-207		CK73-B1E107*	CHIP C	0.010.F	K
C208-216		CK73F81H471K	CHIP C	470F	K
C217		C91-0119-05	SP	0.047.F	
CN1		E40-5131-05	FPC CONNECTOR (16P)		
CN2		E40-5134-05	FPC CONNECTOR (24P)		
CN3		E40-5132-05	FPC CONNECTOR (14P)		
CN4		E40-5135-05	FPC CONNECTOR (21P)		
CN5		E40-5134-05	PIN CONNECTOR (10P)		
CN6		E40-3233-05	FPC CONNECTOR (14P)		
CN7		E40-3239-05	PIN CONNECTOR (4P)		
CN8		E40-3241-05	PIN CONNECTOR (6P)		
CN9		E40-3242-05	PIN CONNECTOR (7P)		
CN10		E40-3240-05	PIN CONNECTOR (5P)		
CN11		E40-3243-05	PIN CONNECTOR (5P)		
CN12		E40-3239-05	PIN CONNECTOR (3P)		
CN13		E40-3240-05	PIN CONNECTOR (5P)		
CN14		E40-3241-05	PIN CONNECTOR (6P)		
CN15		E40-3239-05	PIN CONNECTOR (4P)		
CN16		E40-3237-05	PIN CONNECTOR (2P)		
CN17		E40-3241-05	PIN CONNECTOR (6P)		
CN18		E40-3240-05	PIN CONNECTOR (5P)		
CN19		E40-3239-05	PIN CONNECTOR (4P)		
CN20		E40-3237-05	PIN CONNECTOR (2P)		
CN21		E40-3238-05	PIN CONNECTOR (3P)		
CN22		E40-3239-05	PIN CONNECTOR (4P)		
CN23		E40-3242-05	PIN CONNECTOR (7P)		
CN24		E02-2003-05	IC SOCKET (2HP)		
L1-2		L40-1011-13	SMALL FIXED INDUCTOR (100H)		
L3-4		L40-1011-17	SMALL FIXED INDUCTOR (470H)		
L5		L40-1011-17	SMALL FIXED INDUCTOR (100H)		
L6-10		L40-1011-17	SMALL FIXED INDUCTOR (100H)		
L11-12		L40-2211-17	SMALL FIXED INDUCTOR (2200H)		

E Scandinavia & Europe K USA P Canada W Japan

A Pacific Bell Japan F England M Other Areas

JE ASPEC/Europe X Australia

A indicates sales office corresponds

PARTS LIST

New Parts

Parts without Parts No. are not supplied.

As an indication, the following parts are supplied with the main unit.

The above parts are not supplied separately.

Ref. No.	Address	Parts No.	Description	Dest. Re- nation marks
参照番号	位置	部品番号	部品名/規格	仕向番号
U13	1-4	40-1011-13	SMALL CASE INDUCTOR (100μH)	
U15	1-6	40-1011-7	SMALL CASE INDUCTOR (90μH)	
		71-1320-25	CRYSTAL RESONATOR 1. (592MHz)	
U2		P90-0455-01	MULTI COMP 4.75KΩ J 1/4W	
U22	5	390-0598-05	MULTI COMP 7K/27K	
U26	7	P90-0712-01	MULTI COMP 330P 1/4W	
P1	1-69	4K73FB2AXXX	CHIP R	
Y9		R12 1204 05	RESISTOR 12K 1/4W	
U32	5	P12-1050-01	TRIMMING POT. 4.7K	
U4	7	P32-0150-05	TRIMMING POT. 0.3-1M	
S1		359-6403-01	SWITCH/FILTER SELECT	
D1	5	R_S13	CHIP DIODE	
D6	7	7M10	DIODE 1.60V	
D8	1-1	02025...	CHIP ZENER DIODE (5.1V)	
D12		.SS133	DIODE	MX
D14		.SS133	DIODE	W2
D15		.SS133	DIODE	M
D17		.SS133	DIODE	CHW2
D18	19	.SS133	DIODE	
D20		QLE77	CHIP DIODE	
D21		R_S13	CHIP DIODE	X
IC1		LP379C100-36	IC (MICROPROCESSOR)	
IC2		270256A-25.0M	IC (MEM)	
IC3		TC5564AP-15	IC (4KΩ 1/4W)	
IC4		TC74HC593AF	IC (LATCH)	
IC5		TC74-C133A2	IC (DECODER)	
IC6		CX110952	IC (1/4W)	
IC7		78092430	IC (MICROPROCESSOR)	
IC8		CX110952	IC (1/4W)	
IC9	10	252133	IC (CONVERTER)	
IC11		NJ4558R	IC (AMP 1/2)	
IC12		TC4584BF	IC (INVERTER)	
IC13		78056	IC (1/4W) CONVT	
IC14		751951EM	IC (SYSTEM RESET)	
IC15		SN74C87	IC (1/4W) 1/2 INVERTER	
IC16		LM2902P	IC (AMP 1/4)	
IC17	13	TC4565F	IC (INVERTER GATE)	
IC19-21		TC4581F	IC (AND GATE)	
Q1	11	7M10	DIGITAL TRANSISTOR	
BA1		W09-0514-05	1.2V BATTERY	
IF UNIT (X48-3060-00)				
C1		CK73FB1H222K	CHIP C 2200PF K	
C2		CK73FB1H222K	CHIP C 0.1μF Z	
C3	5	CK73FB1H222K	CHIP C	
C4	1-1	CK73FB1H222K	CHIP C	
C11		CK73FB1H222K	CHIP C 2200PF K	
C13		CK73FB1H103K	CHIP C 0.010μF K	
C14		CK73FB1H103K	CHIP C 10PF Z	
C15	19	CK73FB1H103K	CHIP C 0.010μF K	
C20		CK73FB1H103K	CHIP C 100PF J	
C21	23	CK73FB1H103K	CHIP C 0.010μF K	
C24		CK73FB1H222K	CHIP C 0.1μF Z	

E: Schenck & Co. K: USA P: Canada W: Europe

L: FAX/Fax 44444 T: Telex Y: Other Areas

LE: LATEX Europe X: X-axis

⚠ indicates safety critical components

PARTS LIST

Notes:

- Parts without Parts No. are not supplied.
- Articles not marked with Parts No. do not have parts.
- For other Parts No. see other parts list.

Ref. No.	Address	Part No.	Description	Designation	Remarks
参照番号	位置	部品番号	部品名 / 記号	仕向	備考
C149		CC45E2H12LP	CERAMIC	220PF	
C152-52		CK737B1H102K	CHIP C	10.0PF	
C153		CC73FCH1H101J	C-73 C	100PF	
C154-75		CK737F1E104Z	CHIP C	0.10PF	
C155		CC73FCH1H101J	C-73 C	100PF	
C157		CE145M1A101M	ELECTRO	1000	CMV
C158		CK737F1E104Z	CHIP C	0.10PF	Z
C159		CE145M1C101M	ELECTRO	1000	CMV
C161		CK737CF1E105Z	CHIP C	1.00PF	Z
C162		CK737B1E102K	CHIP C	0.010PF	K
C163-85		CK737FB1E102K	CHIP C	10.0PF	K
C166		CC737C-1-220J	CHIP C	22PF	J
C167-75		CK737FB1E102K	CHIP C		
C176-177		CC737C-1-220J	CHIP C	22PF	J
C178		CC737SL1H221J	CHIP C	220PF	J
CN1		E40-5067-05	PIN CONNECTOR(10P)		
CN2		E40-3237-05	PIN CONNECTOR(2P)		
CN3		E40-3238-05	PIN CONNECTOR(4P)		
CN4-7		E04-0137-05	RF CRYSTAL JACK		
CN8		E40-3237-05	PIN CONNECTOR(2P)		
CN9		E04-0138-05	RF CRYSTAL JACK		
CN10		E40-3237-05	PIN CONNECTOR(2P)		
CN11		E40-3239-05	PIN CONNECTOR(4P)		
CN12		E23-0401-05	TERMINAL 1P		
CN13		E40-3237-05	PIN CONNECTOR(2P)		
CN14		E40-5069-05	PIN CONNECTOR(10P)		
CN15		E40-3243-05	PIN CONNECTOR(8P)		
CN16		E40-3233-05	PIN CONNECTOR(3P)		
CN17		E40-3237-05	PIN CONNECTOR(2P)		
CN18		E40-3233-05	PIN CONNECTOR(3P)		
CN19-24		E40-5059-05	PIN CONNECTOR(XTAL FILTER)		
J1		E11-0438-05	PHONE JACK(SET)		
J2		E11-0438-05	P-BUS JACK(EXT. SP)		
J3		E06-0152-05	P-A SECRET(ACC2)		
J4		E13-0462-05	P-BUS JACK(304 4P)		
J6		E04-0752-05	P-A CONNECTOR(REMOTE 7P)		
J7-7		E23-0512-05	TERMINAL		
		J32-0761-04	ST-2		
L1		L32-0751-05	CERAMIC FILTER(8.63MHZ)		
L2		L34-2267-05	TUNING COIL		
L3		L34-4205-05	TUNING COIL		
L4-7		L34-4025-05	TUNING COIL		
L8		L30-0201-15	IFT		
L9-11		L34-4206-05	TUNING COIL		
L12		L34-4006-05	TUNING COIL		
L13		L34-4209-05	TUNING COIL		
L14-15		L34-0943-05	TUNING COIL		
L16		L34-0942-05	TUNING COIL		
L17		L34-0943-05	TUNING COIL		
L18		L34-2124-05	TUNING COIL		
L19		L34-0536-05	TUNING COIL		
L20		L34-0751-05	TUNING COIL		
L21		L34-4210-05	TUNING COIL		

E: Standard design R: USA P: Korea W: Japan

U: Power/Electronics T: Engine R: Other Parts

VE: Accessory X: Spare

⚠ Indicates safety critical components

PARTS LIST

Notes: Parts

Parts without Parts No. are not supplied.

Parts are classified by their function in the Parts No. system.

To obtain Parts No. information, refer to the

Ref. No.	Address	Part No.	Description	Destination	Remarks
参照番号	位置	部品番号	部品名 / 規格	仕向	備考
L21, 22		L30-0281-05	TUNING COIL		
L23		L34-4195-05	TUNING COIL		
L24		L34-4207-05	TUNING COIL		
L25		L34-0943-05	TUNING COIL		
L26		L34-076-05	TUNING COIL		
L27, 29		L34-0534-05	TUNING COIL		
L30		L34-076-05	TUNING COIL		
L31		L34-0534-05	TUNING COIL		
L32, 33		L40-1011-14	SMALL FIXED INDUCTOR(100μH)		
L36		L40-2292-14	SMALL FIXED INDUCTOR(2.2μH)		
L37, 39		L40-1011-14	SMALL FIXED INDUCTOR(100μH)		
L41		L40-1011-14	SMALL FIXED INDUCTOR(100μH)		
L42		L40-1001-14	SMALL FIXED INDUCTOR(100μH)		
L43		L40-1011-14	SMALL FIXED INDUCTOR(100μH)		
XF1		L7-0249-05	CRYSTAL FILTER(10.695MHz)		
XF2		L7-0249-05	CRYSTAL FILTER(10.695MHz)		
XF3		L7-0222-05	CRYSTAL FILTER(10.695MHz)		
U	3P	X30-3010-46	FAV-640 MAG-14E SCREW		
R1, 114		R17-0324XXL	CHIP RES		
R15		RD148420103J	CHIP RES		
R116-236		R17-0324XXL	CHIP RES		
R236		RD148420103J	CHIP RES		
VR1		R12-0104-05	TUNING PBT. 220		
VR2, 3		R12-3124-05	TUNING PBT. 10K		
VR4		R12-3124-05	TUNING PBT. 470		
VR5		R12-3124-05	TUNING PBT. 10K		
SW1, 2		SS1-1420-05	RELAY		
Q1		SS1-2419-05	RELAY		
Q2		SS1-2419-05	RELAY		
Q3		SS1-2419-05	RELAY		
Q4		SS1-2419-05	RELAY		
Q5		SS1-2419-05	RELAY		
Q6		SS1-2419-05	RELAY		
Q7		SS1-2419-05	RELAY		
Q8		SS1-2419-05	RELAY		
Q9		SS1-2419-05	RELAY		
Q10		SS1-2419-05	RELAY		
Q11		SS1-2419-05	RELAY		
Q12, 29		SS1-2419-05	RELAY		
Q13		SS1-2419-05	RELAY		
Q14		SS1-2419-05	RELAY		
Q15		SS1-2419-05	RELAY		
Q16		SS1-2419-05	RELAY		
Q17		SS1-2419-05	RELAY		
Q18		SS1-2419-05	RELAY		
Q19		SS1-2419-05	RELAY		
Q20		SS1-2419-05	RELAY		
Q21		SS1-2419-05	RELAY		
Q22		SS1-2419-05	RELAY		
Q23		SS1-2419-05	RELAY		
Q24		SS1-2419-05	RELAY		
Q25		SS1-2419-05	RELAY		
Q26		SS1-2419-05	RELAY		
Q27		SS1-2419-05	RELAY		
Q28		SS1-2419-05	RELAY		
Q29		SS1-2419-05	RELAY		
Q30		SS1-2419-05	RELAY		
Q31		SS1-2419-05	RELAY		
Q32		SS1-2419-05	RELAY		
Q33		SS1-2419-05	RELAY		
Q34		SS1-2419-05	RELAY		
Q35		SS1-2419-05	RELAY		
Q36		SS1-2419-05	RELAY		
Q37		SS1-2419-05	RELAY		
Q38		SS1-2419-05	RELAY		
Q39		SS1-2419-05	RELAY		
Q40		SS1-2419-05	RELAY		
Q41		SS1-2419-05	RELAY		
Q42		SS1-2419-05	RELAY		
Q43		SS1-2419-05	RELAY		
Q44		SS1-2419-05	RELAY		
Q45		SS1-2419-05	RELAY		
Q46		SS1-2419-05	RELAY		
Q47		SS1-2419-05	RELAY		
Q48		SS1-2419-05	RELAY		
Q49		SS1-2419-05	RELAY		
Q50		SS1-2419-05	RELAY		
Q51		SS1-2419-05	RELAY		
Q52		SS1-2419-05	RELAY		
Q53		SS1-2419-05	RELAY		
Q54		SS1-2419-05	RELAY		
Q55		SS1-2419-05	RELAY		
Q56		SS1-2419-05	RELAY		
Q57		SS1-2419-05	RELAY		
Q58		SS1-2419-05	RELAY		
Q59		SS1-2419-05	RELAY		
Q60		SS1-2419-05	RELAY		
Q61		SS1-2419-05	RELAY		
Q62		SS1-2419-05	RELAY		
Q63		SS1-2419-05	RELAY		
Q64		SS1-2419-05	RELAY		
Q65		SS1-2419-05	RELAY		
Q66		SS1-2419-05	RELAY		
Q67		SS1-2419-05	RELAY		
Q68		SS1-2419-05	RELAY		
Q69		SS1-2419-05	RELAY		
Q70		SS1-2419-05	RELAY		
Q71		SS1-2419-05	RELAY		
Q72		SS1-2419-05	RELAY		
Q73		SS1-2419-05	RELAY		
Q74		SS1-2419-05	RELAY		
Q75		SS1-2419-05	RELAY		
Q76		SS1-2419-05	RELAY		
Q77		SS1-2419-05	RELAY		
Q78		SS1-2419-05	RELAY		
Q79		SS1-2419-05	RELAY		
Q80		SS1-2419-05	RELAY		
Q81		SS1-2419-05	RELAY		
Q82		SS1-2419-05	RELAY		
Q83		SS1-2419-05	RELAY		
Q84		SS1-2419-05	RELAY		
Q85		SS1-2419-05	RELAY		
Q86		SS1-2419-05	RELAY		
Q87		SS1-2419-05	RELAY		
Q88		SS1-2419-05	RELAY		
Q89		SS1-2419-05	RELAY		
Q90		SS1-2419-05	RELAY		
Q91		SS1-2419-05	RELAY		
Q92		SS1-2419-05	RELAY		
Q93		SS1-2419-05	RELAY		
Q94		SS1-2419-05	RELAY		
Q95		SS1-2419-05	RELAY		
Q96		SS1-2419-05	RELAY		
Q97		SS1-2419-05	RELAY		
Q98		SS1-2419-05	RELAY		
Q99		SS1-2419-05	RELAY		
Q100		SS1-2419-05	RELAY		

E: Europe, F: France, G: Germany, H: Hong Kong, I: India, J: Japan, K: Korea, L: Latin America, M: Malaysia, N: New Zealand, O: Oceania, P: Pacific, Q: Qatar, R: Russia, S: Saudi Arabia, T: Taiwan, U: United Kingdom, V: United States, W: Western Europe, X: Xmas, Y: Year, Z: Zone

U: Parts, V: Parts, W: Parts, X: Parts, Y: Parts, Z: Parts

U: Parts, V: Parts, W: Parts, X: Parts, Y: Parts, Z: Parts

△ indicates entry critical components

PARTS LIST

* New Parts

Parts without Part No. are not supplied.

Lesen Sie die Teilenummern immer mit dem Teilenummernverzeichnis.

Tells of the Parts No. werden nicht angegeben.

Ref. No. 参照番号	Address No. 位置番号	Parts No. 部品番号	Description 部品名/電番	Dist. - Re- tailer name
Q11		2SC2714(Y)	CHIP TRANSISTOR	
Q12		2SC2712(Y)	C-12 TRANSISTOR	
Q13		2SC2714(Y)	CHIP TRANSISTOR	
Q14		3SK131(M)	C-12 FET	
Q15	1, 2	2SK520(E44)	CHIP FET	
Q17		2SC2712(Y)	C-12 TRANSISTOR	
Q18		2SA 162(Y)	CHIP TRANSISTOR	
Q19	2D	3SK131(M)	C-12 FET	
Q2	22	2SC2712(Y)	CHIP TRANSISTOR	
Q23		2SC2714(Y)	C-12 TRANSISTOR	
Q24		2SA 162(M)	CHIP FET	
Q25		2SC2714(Y)	C-12 TRANSISTOR	
Q26		2SA1201(B)	CHIP FET	
Q27	29	2SC2714(Y)	C-12 TRANSISTOR	
Q30		2SC2712(Y)	CHIP TRANSISTOR	
Q31		2SC2714(Y)	C-12 TRANSISTOR	
Q32	31	2SC2712(Y)	CHIP TRANSISTOR	
Q34		DTA 145K	DIGITAL TRANSISTOR	
Q35		2SA 162(Y)	CHIP TRANSISTOR	
Q36	38	3SK131(M)	C-12 FET	
Q38		2SC2714(Y)	CHIP TRANSISTOR	
Q40		2SC2712(Y)	C-12 TRANSISTOR	
Q41		3SK131(M)	CHIP FET	
Q42		2SC3324(C)	C-12 TRANSISTOR	
Q44		* 2SK520(E44)	CHIP FET	
Q45		DTC 1245K	DIGITAL TRANSISTOR	
TH1	2	1.2-502-2	THERMISTOR 5K	
TH3		1.2-501-2	THERMISTOR 50K	
X59 3760 CO			POWER UNIT (H2)	

AF UNIT (X49-3020-00)

C1		CK73FB1H4725	CHIP C	4700PF	K
C2	3	CK73FB1E1042	C-12 C	2 10-F	Z
C4		CK73FB1E103K	CHIP C	0.010UF	K
C5	1, 2	CK73FB1E1042	C-12 C	2 10-F	Z
C11		CE045M1C470R	ELECTR9	47.0F	.5MV
C12		CE045M1H1C10R	ELECTR9	1 10F	50MV
C13		CE045M1C470R	ELECTR9	47.0F	.5MV
C14		CE045M1H1C10R	ELECTR9	1 10F	50MV
C15	16	CK73FB1C105Z	CHIP C	1 0UF	Z
C17		CK73FB1H473K	C-12 C	2 470F	K
C18		CK73FB1E104Z	CHIP C	0.010F	Z
C19		CK73FB1C105Z	C-12 C	1 10F	Z
C20		CE045M1H1C10R	ELECTR9	1 10F	50MV
C21		CE045M1C470R	ELECTR9	47.0F	.5MV
C22		CE045M1H1C10R	ELECTR9	1 10F	50MV
C23	24	CE045M1C470R	ELECTR9	47.0F	.5MV
C25		CE045M1H1C10R	ELECTR9	1 10F	50MV
C26		CE045M1E4R7R	ELECTR9	4 10F	25MV
C27		CK73FB1C105Z	CHIP C	1 10F	Z
C28		CE045M1E4R7R	ELECTR9	4 10F	25MV
C29		CK73FB1C105Z	C-12 C	1 10F	Z
C30		CK73FB1H102K	C-12 C	1000-F	K
C31		CE045M1C470R	ELECTR9	47.0F	.5MV
C32	34	CE045M1C105R	ELECTR9	10.0F	.5MV

E: Standard Europe C: USA P: Canada W: Europe

U: Far East, Hawaii T: England M: Other Area

UE: AFES/Europe X: Australia

⚠ Please study circuit components

PARTS LIST

See New Parts

Part 3 listed. Parts No. 5 & 9 of Sub. 10.

Let's see if we can't find some more parts. No. 1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

Ref. No.	Address No.	Parts No.	Description	Dist. Re- lation
参照番号	位置番号	部品番号	部品名/量	位置関係
C30		CE04E1.1.1031	CHIP C	0.010UF
C31		CE04E1.1.1031	CHIP C	0.010UF
C32		CE04E1.1.1031	CHIP C	0.010UF
C33	159	CE04E1.1.1031	CHIP C	0.010UF
C40		CE04E1.1.1031	CHIP C	0.010UF
C41	122	CE04E1.1.1031	CHIP C	0.010UF
C42		CE04E1.1.1031	CHIP C	0.010UF
C43		CE04E1.1.1031	CHIP C	0.010UF
C44		CE04E1.1.1031	CHIP C	0.010UF
C45		CE04E1.1.1031	CHIP C	0.010UF
C46		CE04E1.1.1031	CHIP C	0.010UF
C47		CE04E1.1.1031	CHIP C	0.010UF
C48		CE04E1.1.1031	CHIP C	0.010UF
C49		CE04E1.1.1031	CHIP C	0.010UF
C50		CE04E1.1.1031	CHIP C	0.010UF
C51	152	CE04E1.1.1031	CHIP C	0.010UF
C52		CE04E1.1.1031	CHIP C	0.010UF
C53		CE04E1.1.1031	CHIP C	0.010UF
C54		CE04E1.1.1031	CHIP C	0.010UF
C55		CE04E1.1.1031	CHIP C	0.010UF
C56		CE04E1.1.1031	CHIP C	0.010UF
C57		CE04E1.1.1031	CHIP C	0.010UF
C58	160	CE04E1.1.1031	CHIP C	0.010UF
C59	161	CE04E1.1.1031	CHIP C	0.010UF
C60		CE04E1.1.1031	CHIP C	0.010UF
C61	162	CE04E1.1.1031	CHIP C	0.010UF
C62		CE04E1.1.1031	CHIP C	0.010UF
C63	163	CE04E1.1.1031	CHIP C	0.010UF
C64		CE04E1.1.1031	CHIP C	0.010UF
C65	164	CE04E1.1.1031	CHIP C	0.010UF
C66		CE04E1.1.1031	CHIP C	0.010UF
C67	168	CE04E1.1.1031	CHIP C	0.010UF
C68		CE04E1.1.1031	CHIP C	0.010UF
C69		CE04E1.1.1031	CHIP C	0.010UF
C70		CE04E1.1.1031	CHIP C	0.010UF
C71	172	CE04E1.1.1031	CHIP C	0.010UF
C72	174	CE04E1.1.1031	CHIP C	0.010UF
C73		CE04E1.1.1031	CHIP C	0.010UF
C74		CE04E1.1.1031	CHIP C	0.010UF
C75	180	CE04E1.1.1031	CHIP C	0.010UF
C76		CE04E1.1.1031	CHIP C	0.010UF
C77		CE04E1.1.1031	CHIP C	0.010UF
C78		CE04E1.1.1031	CHIP C	0.010UF
C79		CE04E1.1.1031	CHIP C	0.010UF
C80		CE04E1.1.1031	CHIP C	0.010UF
C81		CE04E1.1.1031	CHIP C	0.010UF
C82		CE04E1.1.1031	CHIP C	0.010UF
C83		CE04E1.1.1031	CHIP C	0.010UF
C84		CE04E1.1.1031	CHIP C	0.010UF
C85	189	CE04E1.1.1031	CHIP C	0.010UF
C86		CE04E1.1.1031	CHIP C	0.010UF
C87		CE04E1.1.1031	CHIP C	0.010UF
C88		CE04E1.1.1031	CHIP C	0.010UF
C89		CE04E1.1.1031	CHIP C	0.010UF
C90		CE04E1.1.1031	CHIP C	0.010UF
C91		CE04E1.1.1031	CHIP C	0.010UF
C92		CE04E1.1.1031	CHIP C	0.010UF
C93	197	CE04E1.1.1031	CHIP C	0.010UF
C94	101	CE04E1.1.1031	CHIP C	0.010UF
C95	103	CE04E1.1.1031	CHIP C	0.010UF
C96	105	CE04E1.1.1031	CHIP C	0.010UF
C97	106	CE04E1.1.1031	CHIP C	0.010UF
C98	107	CE04E1.1.1031	CHIP C	0.010UF
C99	108	CE04E1.1.1031	CHIP C	0.010UF
C100	109	CE04E1.1.1031	CHIP C	0.010UF
C101	110	CE04E1.1.1031	CHIP C	0.010UF
C102	111	CE04E1.1.1031	CHIP C	0.010UF
C103	112	CE04E1.1.1031	CHIP C	0.010UF
C104	113	CE04E1.1.1031	CHIP C	0.010UF
C105	114	CE04E1.1.1031	CHIP C	0.010UF
C106	115	CE04E1.1.1031	CHIP C	0.010UF
C107	116	CE04E1.1.1031	CHIP C	0.010UF
C108	117	CE04E1.1.1031	CHIP C	0.010UF
C109	118	CE04E1.1.1031	CHIP C	0.010UF
C110	119	CE04E1.1.1031	CHIP C	0.010UF
C111	120	CE04E1.1.1031	CHIP C	0.010UF
C112	121	CE04E1.1.1031	CHIP C	0.010UF
C113	122	CE04E1.1.1031	CHIP C	0.010UF
C114	123	CE04E1.1.1031	CHIP C	0.010UF
C115	124	CE04E1.1.1031	CHIP C	0.010UF
C116	125	CE04E1.1.1031	CHIP C	0.010UF
C117	126	CE04E1.1.1031	CHIP C	0.010UF
C118	127	CE04E1.1.1031	CHIP C	0.010UF
C119	128	CE04E1.1.1031	CHIP C	0.010UF
C120	129	CE04E1.1.1031	CHIP C	0.010UF
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C122	131	CE04E1.1.1031	CHIP C	0.010UF
C123	132	CE04E1.1.1031	CHIP C	0.010UF
C124	133	CE04E1.1.1031	CHIP C	0.010UF
C125	134	CE04E1.1.1031	CHIP C	0.010UF
C126	135	CE04E1.1.1031	CHIP C	0.010UF
C127	136	CE04E1.1.1031	CHIP C	0.010UF
C128	137	CE04E1.1.1031	CHIP C	0.010UF
C129	138	CE04E1.1.1031	CHIP C	0.010UF
C130	139	CE04E1.1.1031	CHIP C	0.010UF
C131	140	CE04E1.1.1031	CHIP C	0.010UF
C132	141	CE04E1.1.1031	CHIP C	0.010UF
C133	142	CE04E1.1.1031	CHIP C	0.010UF
C134	143	CE04E1.1.1031	CHIP C	0.010UF
C135	144	CE04E1.1.1031	CHIP C	0.010UF
C136	145	CE04E1.1.1031	CHIP C	0.010UF
C137	146	CE04E1.1.1031	CHIP C	0.010UF
C138	147	CE04E1.1.1031	CHIP C	0.010UF
C139	148	CE04E1.1.1031	CHIP C	0.010UF
C140	149	CE04E1.1.1031	CHIP C	0.010UF
C141	150	CE04E1.1.1031	CHIP C	0.010UF
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C143	152	CE04E1.1.1031	CHIP C	0.010UF
C144	153	CE04E1.1.1031	CHIP C	0.010UF
C145	154	CE04E1.1.1031	CHIP C	0.010UF
C146	155	CE04E1.1.1031	CHIP C	0.010UF
C147	156	CE04E1.1.1031	CHIP C	0.010UF
C148	157	CE04E1.1.1031	CHIP C	0.010UF
C149	158	CE04E1.1.1031	CHIP C	0.010UF
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C151	160	CE04E1.1.1031	CHIP C	0.010UF
C152	161	CE04E1.1.1031	CHIP C	0.010UF
C153	162	CE04E1.1.1031	CHIP C	0.010UF
C154	163	CE04E1.1.1031	CHIP C	0.010UF
C155	164	CE04E1.1.1031	CHIP C	0.010UF
C156	165	CE04E1.1.1031	CHIP C	0.010UF
C157	166	CE04E1.1.1031	CHIP C	0.010UF
C158	167	CE04E1.1.1031	CHIP C	0.010UF
C159	168	CE04E1.1.1031	CHIP C	0.010UF
C160	169	CE04E1.1.1031	CHIP C	0.010UF
C161	170	CE04E1.1.1031	CHIP C	0.010UF
C162	171	CE04E1.1.1031	CHIP C	0.010UF
C163	172	CE04E1.1.1031	CHIP C	0.010UF
C164	173	CE04E1.1.1031	CHIP C	0.010UF
C165	174	CE04E1.1.1031	CHIP C	0.010UF
C166	175	CE04E1.1.1031	CHIP C	0.010UF
C167	176	CE04E1.1.1031	CHIP C	0.010UF
C168	177	CE04E1.1.1031	CHIP C	0.010UF
C169	178	CE04E1.1.1031	CHIP C	0.010UF
C170	179	CE04E1.1.1031	CHIP C	0.010UF
C171	180	CE04E1.1.1031	CHIP C	0.010UF
C172	181	CE04E1.1.1031	CHIP C	0.010UF
C173	182	CE04E1.1.1031	CHIP C	0.010UF
C174	183	CE04E1.1.1031	CHIP C	0.010UF
C175	184	CE04E1.1.1031	CHIP C	0.010UF
C176	185	CE04E1.1.1031	CHIP C	0.010UF
C177	186	CE04E1.1.1031	CHIP C	0.010UF
C178	187	CE04E1.1.1031	CHIP C	0.010UF
C179	188	CE04E1.1.1031	CHIP C	0.010UF
C180	189	CE04E1.1.1031	CHIP C	0.010UF
C181	190	CE04E1.1.1031	CHIP C	0.010UF
C182	191	CE04E1.1.1031	CHIP C	0.010UF
C183	192	CE04E1.1.1031	CHIP C	0.010UF
C184	193	CE04E1.1.1031	CHIP C	0.010UF
C185	194	CE04E1.1.1031	CHIP C	0.010UF
C186	195	CE04E1.1.1031	CHIP C	0.010UF
C187	196	CE04E1.1.1031	CHIP C	0.010UF
C188	197	CE04E1.1.1031	CHIP C	0.010UF
C189	198	CE04E1.1.1031	CHIP C	0.010UF
C190	199	CE04E1.1.1031	CHIP C	0.010UF
C191	200	CE04E1.1.1031	CHIP C	0.010UF
C192	201	CE04E1.1.1031	CHIP C	0.010UF
C193	202	CE04E1.1.1031	CHIP C	0.010UF
C194	203	CE04E1.1.1031	CHIP C	0.010UF
C195	204	CE04E1.1.1031	CHIP C	0.010UF
C196	205	CE04E1.1.1031	CHIP C	0.010UF
C197	206	CE04E1.1.1031	CHIP C	0.010UF
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C202	211	CE04E1.1.1031	CHIP C	0.010UF
C203	212	CE04E1.1.1031	CHIP C	0.010UF
C204	213	CE04E1.1.1031	CHIP C	0.010UF
C205	214	CE04E1.1.1031	CHIP C	0.010UF
C206	215	CE04E1.1.1031	CHIP C	0.010UF
C207	216	CE04E1.1.1031	CHIP C	0.010UF
C208	217	CE04E1.1.1031	CHIP C	0.010UF
C209	218	CE04E1.1.1031	CHIP C	0.010UF
C210	219	CE04E1.1.1031	CHIP C	0.010UF
C211	220	CE04E1.1.1031	CHIP C	0.010UF
C212	221	CE04E1.1.1031	CHIP C	0.010UF
C213	222	CE04E1.1.1031	CHIP C	0.010UF
C214	223	CE04E1.1.1031	CHIP C	0.010UF
C215	224	CE04E1.1.1031	CHIP C	0.010UF
C216	225	CE04E1.1.1031	CHIP C	0.010UF
C217	226	CE04E1.1.1031	CHIP C	0.010UF
C218	227	CE04E1.1.1031	CHIP C	0.010UF
C219	228	CE04E1.1.1031	CHIP C	0.010UF
C220	229	CE04E1.1.1031	CHIP C	0.010UF
C221	230	CE04E1.1.1031	CHIP C	0.010UF
C222	231	CE04E1.1.1031	CHIP C	0.010UF
C223	232	CE04E1.1.1031	CHIP C	0.010UF
C224	233	CE04E1.1.1031	CHIP C	0.010UF
C225	234	CE04E1.1.1031	CHIP C	0.010UF
C226	235	CE04E1.1.1031	CHIP C	0.010UF
C227	236	CE04E1.1.1031	CHIP C	0.010UF
C228	237	CE04E1.1.1031	CHIP C	0.010UF
C229	238	CE04E1.1.1031	CHIP C	0.010UF
C230	239	CE04E1.1.1031	CHIP C	0.010UF
C231	240	CE04E1.1.1031	CHIP C	0.010UF
C232	241	CE04E1.1.1031	CHIP C	0.010UF
C233	242	CE04E1.1.1031	CHIP C	0.010UF
C234	243	CE04E1.1.1031	CHIP C	0.010UF
C235	244	CE04E1.1.1031	CHIP C	0.010UF
C236	245	CE04E1.1.1031	CHIP C	0.010UF
C237	246	CE04E1.1.1031	CHIP C	0.010UF
C238	247	CE04E1.1.1031	CHIP C	0.010UF
C239	248	CE04E1.1.1031	CHIP C	0.010UF
C240	249	CE04E1.1.1031	CHIP C	0.010UF
C241	250	CE04E1.1.1031	CHIP C	0.010UF
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C243	252	CE04E1.1.1031	CHIP C	0.010UF
C244	253	CE04E1.1.1031	CHIP C	0.010UF
C245	254	CE04E1.1.1031	CHIP C	0.010UF
C246	255	CE04E1.1.1031	CHIP C	0.010UF
C247	256	CE04E1.1.1031	CHIP C	0.010UF
C248	257	CE04E1.1.1031	CHIP C	0.010UF
C249	258	CE04E1.1.1031	CHIP C	0.010UF
C250	259	CE04E1.1.1031	CHIP C	0.010UF
C251	260	CE04E1.1.1031	CHIP C	0.010UF
C252	261	CE04E1.1.1031	CHIP C	0.010UF
C253	262	CE04E1.1.1031	CHIP C	0.010UF
C254	263	CE04E1.1.1031	CHIP C	0.010UF
C255	264	CE04E1.1.1031	CHIP C	0.010UF
C256	265	CE04E1.1.1031	CHIP C	0.010UF
C257	266	CE04E1.1.1031	CHIP C	0.010UF
C258	267	CE04E1.1.1031	CHIP C	0.010UF
C259	268	CE04E1.1.1031	CHIP C	0.010UF
C260	269	CE04E1.1.1031	CHIP C	0.010UF
C261	270	CE04E1.1.1031	CHIP C	0.010UF
C262	271	CE04E1.1.1031	CHIP C	0.010UF
C263	272	CE04E1.1.1031	CHIP C	0.010UF

TS-950S/SD

PARTS LIST

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Parts without Parts 'n' are not supported

as set a 99 ton bent cranes day to Park. No the bent cost 1.2 million.

To: 83116 Parts No. 487081 1011 Call 4701

Ref No	Address	Part No	Parts No	Description	Designation	Remarks
参照番号	位置		部品番号	部品名 / 規格	仕向	備考
C.37			CK73FB1H102K	C-12 C	100PF	K
C.38			CK73FB1E103K	C-12 C	1000PF	K
C139			CK73FB1H102K	C-12 C	100PF	K
C.40			CK73FB1E103K	C-12 C	1000PF	K
C141			CE04EM1C470M	ELECTR9	47UF	16mV
C.42,143			CK73FB1E103K	C-12 C	1000PF	K
C144			CG92M1-3334	WELAP	0.033UF	K
C145			CE04EM1C470M	ELECTR9	47UF	16mV
C146			C91-1 C1-05	FILN	0.22UF	63mV
C147			CS1E15747M	TANTA.	1.47UF	35mV
C148			CK451-1-024	CHIP C	100PF	K
C149			CK73FB1E103K	C-12 C	1000PF	Z
C150			CE04EM1C101M	ELECTR9	100UF	16mV
C151-153			CK73FB1E102K	C-12 C	1000PF	K
C154-156			CC73FC-1-XXXJ	CHIP C		
C157			CK73FB1H102K	C-12 C	1000PF	K
C158			CK73FB1E104Z	CHIP C	0.1UF	Z
C159			CE04EM1C470M	ELECTR9	47UF	60V
C160			CK73FB1E104Z	CHIP C	0.1UF	Z
C161			CE04EM1C470M	ELECTR9	47UF	60V
C162			CK73FB1E104Z	CHIP C	0.1UF	Z
C163			CE04EM1C470M	ELECTR9	47UF	60V
C.64			CC73FC-1H470J	CHIP C	47PF	J
C165-166			CK73FB1E473Z	C-12 C	0.047UF	Z
C.67			CE04EM1C470M	ELECTR9	47UF	16mV
C168			CK73FB1H102K	C-12 C	1000PF	K
C.69			CE04EM1H470M	ELECTR9	0.47UF	50mV
C170			CE04EM1H101M	ELECTR9	1.0UF	50mV
C.71,172			CK73FB1E104Z	CHIP C	0.1UF	Z
C173			CK73FB1E103K	C-12 C	1000PF	K
C174			CK73FB1E473Z	CHIP C	0.047UF	Z
C.75			CK73FB1E103K	C-12 C	1000PF	K
C176			CK73FB1H102K	CHIP C	100PF	K
C.77			CK73FB1E104Z	C-12 C	1000PF	Z
C178			CK73FB1E102K	CHIP C	100PF	K
C.79			CC73FB1-33 J	C-12 C	330PF	J
C180			CK73FB1E102K	CHIP C	100PF	K
C181			CC73FB1-33 J	C-12 C	330PF	J
C182			CK73FB1E104Z	CHIP C	0.1UF	Z
C183			CK73FB1H102K	C-12 C	1000PF	K
C184,185			CK73FB1E104Z	CHIP C	0.1UF	Z
C186,187			CK73FB1H102K	CHIP C	1000PF	K
C188			CC73FSLH151J	CHIP C	150PF	J
C189			CE04EM1E470M	ELECTR9	4.7UF	25mV
CN1			E40-3235-05	PC CONNECTOR	14P	
CN2			E40-3237-05	PIN CONNECTOR	12P	
CN3			E40-3241-05	PIN CONNECTOR	6P	
CN4,5			E40-3239-05	PIN CONNECTOR	14P	
CN6			E40-3237-05	PIN CONNECTOR	12P	
CN7			E40-3240-05	PIN CONNECTOR	6P	
CN8			E40-3243-05	PIN CONNECTOR	8P	
CN9			E40-3237-05	PIN CONNECTOR	12P	
CN10			E40-3237-05	PIN CONNECTOR	14P	
CN11			E40-3238-05	PIN CONNECTOR	12P	

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J: Pk: Far East House: T: England M: 3/10/2000

USE A4F5E.10001 24 April 84

 indicates safety critical components

PARTS LIST

2015-16-15

after which the Parts No. 4 are not needed.

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Take your Park's No water gun debate

| Ref. No. | Address | Parts No. | Description | Destination | Remarks |
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| 参照番号 | 位置 | 部品番号 | 部品名/規格 | 仕向 | 備考 |
| IC7, 8 | | ICM45507 | ICM45507 X23 | | |
| IC9 | | TC45783P | TC45783-91 VOLT | | |
| IC10 | | TC4568B | TC4568-AL SWITCH X23 | | |
| IC11 | | CM31225R | IC-P.L.L. | | |
| IC12 | | 5A76514A | IC-P.L.L. 1-100 | | |
| IC13 | | CM31225R | IC-P.L.L. | | |
| IC14 | | AN78M10 | IC-10V 4.4V | | |
| IC15 | | AN78M05 | IC-5V 4.0V | | |
| Q1 | | 2SC2712-Y | C-12 TRANSISTOR | | |
| Q2 | | 2TC124E | DIGITAL TRANSISTOR | | |
| Q3 | | DTA124E | DIGITAL TRANSISTOR | | |
| Q4 | | 2TC124E | DIGITAL TRANSISTOR | | |
| Q5 | | DTA124E | DIGITAL TRANSISTOR | | |
| Q6 | | 2SD1757-K | CHIP TRANSISTOR | | |
| Q7 | | 2SC2712-Y | C-12 TRANSISTOR | | |
| Q8, 9 | | 2SD1757-K | CHIP TRANSISTOR | | |
| Q10, 11 | | 2SC2712-Y | C-12 TRANSISTOR | | |
| Q12 | | 2SD1757-K | CHIP TRANSISTOR | | |
| Q13, 14 | | DTA124E | DIGITAL TRANSISTOR | | |
| Q15 | | 2SC2712-Y | CHIP TRANSISTOR | | |
| Q16 | | 2TC144W | DIGITAL TRANSISTOR | | |
| Q17 | | 2TC124E | DIGITAL TRANSISTOR | | |
| Q18, 19 | | DTA124E | DIGITAL TRANSISTOR | | |
| Q20 | | 2SC2712-Y | CHIP TRANSISTOR | | |
| Q21, 22 | | DTA124E | DIGITAL TRANSISTOR | | |
| Q23, 24 | | 2TC114E | DIGITAL TRANSISTOR | | |
| Q25 | | 2TC114E | DIGITAL TRANSISTOR | | |
| Q26 | | 2SC3324-G | CHIP TRANSISTOR | | |
| Q27, 28 | | 2SC2714-Y | C-12 TRANSISTOR | | |
| Q29 | | 2SC2996-Y | CHIP TRANSISTOR | | |
| Q30 | | 2SC2712-Y | C-12 TRANSISTOR | | |
| Q31 | | 2SC2714-Y | CHIP TRANSISTOR | | |
| Q32, 33 | | 2SK210-GR | C-12 P.E.T. | | |
| Q34 | | 2SC2712-Y | CHIP TRANSISTOR | | |
| Q35 | | DTA124E | DIGITAL TRANSISTOR | | |
| Q36 | | 2SA1112-Y | CHIP TRANSISTOR | | |
| Q37 | | 2TC114E | DIGITAL TRANSISTOR | | |
| Q38 | | DTA124E | DIGITAL TRANSISTOR | | |
| Q39 | | 2TC124E | DIGITAL TRANSISTOR | | |
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| Q267 | | 2SA1112-Y | CHIP TRANSISTOR | | |
| Q268 | | 2SA1112-Y | CHIP TRANSISTOR | | |

E. Standing balance: R. 54 F. 50 W. 50

U: 907 W. East Street T: 634-9300 800-235-3333

JE 44RE5319001 2: April 2015

⚠️ Brake safety at all times

PARTS LIST

* New Parts

Parts without Parts No. are not supplied

Les pièces sans numéro de pièce ne sont pas fournies

Teile ohne Parts No. werden nicht geliefert

| Ref. No.
参照番号 | Address New Parts
位置番 | Parts No.
部品番号 | Description
部品名/規格 | Designation
記号 |
|------------------|--------------------------|-------------------|-----------------------|-------------------|
| C104 | | CG92M1H223K | MYLAR | 0.022UF K |
| C105 | | C91-1023-03 | FILM | 0.014UF K |
| C106 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C107 | | CE04EVI0470M | ELECTRO | 47UF 16V |
| C108 | | CK73FBIH150K | CHIP C | 15UF K |
| C110 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C111 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C112 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C113 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C114 | | CE04EVI0470M | ELECTRO | 47UF 16V |
| C115 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C116 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C117 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C118 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C119 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C120 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C121 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C122 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C123 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C124 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C125 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C126 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C127 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C128 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C129 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C130 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C131 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C132 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C133 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C134 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C135 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C136 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C137 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C138 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C139 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C140 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C141 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C142 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C143 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C144 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C145 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C146 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C147 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C148 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C149 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C150 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C151 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C152 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C153 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C154 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C155 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C156 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C157 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C158 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C159 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C160 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C161 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C162 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C163 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C164 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C165 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C166 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C167 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C168 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C169 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C170 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C171 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C172 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C173 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C174 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C175 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C176 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C177 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C178 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C179 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C180 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C181 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C182 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C183 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C184 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C185 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C186 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C187 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C188 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C189 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C190 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C191 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C192 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C193 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C194 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C195 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C196 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C197 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C198 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C199 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C200 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C201 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C202 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C203 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C204 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C205 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C206 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C207 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C208 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C209 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C210 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C211 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C212 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C213 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C214 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C215 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C216 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C217 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C218 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C219 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C220 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C221 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C222 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C223 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C224 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C225 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C226 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C227 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C228 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C229 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C230 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C231 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C232 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C233 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C234 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C235 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C236 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C237 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C238 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C239 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C240 | | CK73FBIH102K | CHIP C | 0.01UF K |
| C241 | | CK73FBIH102K | CHIP C | 0.01UF K |

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U.S. Far East Division, Tokyo, Japan

U.S. Far East Division, Tokyo, Japan

Indicates safety critical components

PARTS LIST

492 975

Part 5 Micro - Parts No. are marked on

Les articles non mentionnés dans le *Tableau* ne sont pas fixés.

“ਗੈਰ ਤੀਜਾ ਪਾਤਸ਼ਾਹ ਨਾਮ ਅਰਥਾਤ: ਤੀਜੀ ਗੁਰੂ ਸਾਹਿਬ”

| Ref. No. | Address No. | Part No. | Description | Distribution | Remarks |
|----------|-------------|------------|----------------------------|--------------|---------|
| 参照番号 | 位置番 | 部品番号 | 部品名/記号 | 仕向 | 備考 |
| L46 | | 54-4200-03 | S.F. 20 275-38.2.5MFX | | |
| L47 | | L40- 11-14 | SVAL FIXED INDUCTOR: 1000- | | |
| L48 | | 40-8282-17 | SVAL FIXED INDUCTOR: 0.020 | | |
| L49 | | L40 552 17 | SVAL FIXED INDUCTOR: 1.50- | | |
| L50 | | 40 1032-17 | SVAL FIXED INDUCTOR: 10.0H | | |
| L51 | 52 | 40-1011-14 | SVAL FIXED INDUCTOR: 1000- | | |
| L52 | | 40 1032 17 | SVAL FIXED INDUCTOR: 1000- | | |
| L53 | | 40 1552 17 | SVAL FIXED INDUCTOR: 1.50- | | |
| L54 | | 40-1032-17 | SVAL FIXED INDUCTOR: 1000- | | |
| L55 | | 33-2663 01 | C-SIDE 26.6 100 | | |
| L56 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L57 | | 34 1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L58 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L59 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L60 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L61 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L62 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L63 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L64 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L65 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L66 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L67 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L68 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L69 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L70 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L71 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L72 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L73 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L74 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L75 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L76 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L77 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L78 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L79 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L80 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L81 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L82 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L83 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L84 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L85 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L86 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L87 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L88 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L89 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L90 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L91 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L92 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L93 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L94 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L95 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L96 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L97 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L98 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L99 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L100 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L101 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L102 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L103 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L104 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L105 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L106 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L107 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
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| L116 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
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| L136 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L137 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L138 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L139 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
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| L141 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L142 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
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| L145 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
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| L147 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
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| L149 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L150 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L151 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
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| L153 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L154 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L155 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L156 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
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| L158 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
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| L160 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
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| L162 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L163 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L164 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L165 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L166 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L167 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L168 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L169 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L170 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L171 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L172 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L173 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L174 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L175 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L176 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L177 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L178 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L179 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L180 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L181 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L182 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L183 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L184 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
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| L186 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L187 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L188 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L189 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L190 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L191 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L192 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L193 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L194 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L195 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L196 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L197 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L198 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L199 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L200 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L201 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L202 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L203 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L204 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L205 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L206 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L207 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L208 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L209 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L210 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L211 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L212 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L213 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L214 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L215 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L216 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L217 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L218 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L219 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L220 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L221 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L222 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L223 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L224 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L225 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L226 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L227 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L228 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L229 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L230 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L231 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L232 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L233 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L234 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L235 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L236 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L237 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L238 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L239 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L240 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L241 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L242 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L243 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L244 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L245 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L246 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L247 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L248 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L249 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L250 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L251 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L252 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L253 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L254 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L255 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L256 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L257 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L258 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L259 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L260 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L261 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L262 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L263 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L264 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L265 | | 34-1.24 01 | CRYSTAL RESONATOR: 50 KHZ | | |
| L266 | | 34-1.24 0 | | | |

E. Scandrogna, M. E. Lopez / E. USA 17 (2004) 103–114 109

* FAX: 708-698-1400 E-mail: info@village.com

LE 44-51E, 1954. X 4. 1954.

A indicates safety critical components

PARTS LIST

* New Parts

Parts without Part No. are not supplied.

Les pièces non mentionnées dans le Parts No. ne sont pas fournies.
alle diese Parts No. werden nicht geliefert.

| Ref. No.
参照番号 | Address No.
位置番号 | Part No.
部品番号 | Description
部品名/規格 | Desti- No-
nation part
仕向番号 |
|------------------|---------------------|------------------|-----------------------|-----------------------------------|
| C74-75 | | CC73FC-1-XXXJ | CHIP C | |
| C76-77 | | CK73FB1E107K | C-12 C | |
| C78 | | CC73FCN1HXXJ | C-12 C | |
| C79 | | CE04EM1A470F | ELECT99 | 10uV |
| C80 | | CK73FB1H102K | CHIP C | |
| C81 | | CK73FB1E107K | C-12 C | |
| C82-84 | | CK73FB1H243F | C-12 C | |
| C85-89 | | CK73FB1E107K | C-12 C | |
| C90-96 | | CE04EM1A470F | ELECT99 | 10uV |
| C97 | | CK73FB1E107K | C-12 C | |
| C98 | | CK73FB1E107K | C-12 C | |
| C99 | | CK73FB1E107K | C-12 C | |
| C100 | | CK73FB1E107K | C-12 C | |
| C101 | | CE04EM1A470F | ELECT99 | 10uV |
| C102 | | CK73FB1E107K | C-12 C | |
| C103 | | CK73FB1E107K | C-12 C | |
| C104 | | CK73FB1E107K | C-12 C | |
| C105 | | CK73FB1E107K | C-12 C | |
| C106 | | CE04EM1A470F | ELECT99 | 10uV |
| C107 | | CK73FB1E107K | C-12 C | |
| C108-109 | | CC73FCN1HXXJ | C-12 C | |
| C110 | | CK73FB1E107K | C-12 C | |
| C111-112 | | CC73FCN1HXXJ | C-12 C | |
| C113-114 | | CK73FB1E107K | C-12 C | |
| C115-120 | | CC73FCN1HXXJ | C-12 C | |
| C121,122 | | CK73FB1E107K | C-12 C | |
| C123 | | CK73FB1E107K | C-12 C | |
| C124-125 | | CC73FCN1HXXJ | C-12 C | |
| C127-129 | | CK73FB1E107K | C-12 C | |
| C130-133 | | CK73FB1E107K | C-12 C | |
| C134-136 | | CK73FB1E107K | C-12 C | |
| C137 | | CK73FB1E107K | C-12 C | |
| C138-140 | | CK73FB1HXXJ | C-12 C | |
| C141,142 | | CK73FB1E107K | C-12 C | |
| C143 | | CE04EM1A470F | ELECT99 | 10uV |
| C144 | | CK73FB1E107K | C-12 C | |
| C145,146 | | CK73FB1E107K | C-12 C | |
| C147 | | CE04EM1A470F | ELECT99 | 10uV |
| C148 | | CK73FB1E107K | C-12 C | |
| C149 | | CK73FB1E107K | C-12 C | |
| C150-152 | | CK73FB1HXXJ | C-12 C | |
| C153,154 | | CK73FB1E107K | C-12 C | |
| C155 | | CE04EM1A470F | ELECT99 | 10uV |
| C156-158 | | CK73FB1E107K | C-12 C | |
| C162 | | CE04EM1A470F | ELECT99 | 10uV |
| C163 | | CK73FB1E107K | C-12 C | |
| C164 | | CK73FB1E107K | C-12 C | |
| C165 | | CK73FB1E107K | C-12 C | |
| C166 | | CK73FB1E107K | C-12 C | |
| C167-170 | | CC73FCN1HXXJ | C-12 C | |
| C171 | | CK73FB1E107K | C-12 C | |
| C172 | | CE04EM1A470F | ELECT99 | 10uV |
| C173-175 | | CK73FB1E107K | C-12 C | |
| C176 | | CE04EM1A470F | ELECT99 | 10uV |
| C177 | | CC73FCN1HXXJ | C-12 C | |

E. Scandiam & Europe E. USA P. Canada W. Japan

U. P. Far East, India, T. England M. Oceania

LE. AMFSE, Korea, R. Australia

△ indicates safety critical components

PARTS LIST

* New Parts

Part # without Part No. are not supplied

Les articles non mentionnés dans le Parts No. ne sont pas fournis

Teile ohne Parts No. werden nicht geliefert

| Ref. No.
参照番号 | Address No.
位置番 | Parts No.
部品番号 | Description
部品名/規格 | Dist. No.
販売店番 |
|------------------|--------------------|-------------------|-----------------------------|-------------------|
| C138 | | CE73FE1.3 234 | CHIP C | 1.0.00F |
| C139, .80 | | CE73FE1.3 234 | CHIP C | 20PF |
| C181 | | CE73FE1.3 234 | CHIP C | 1.0.00F |
| C182 | | CE73FE1.3 234 | CHIP C | 47PF |
| C183, 105 | | CE73FE1.3 234 | CHIP C | 1.0.00F |
| C187 | | CE04E1.4470F | ELC187 | 47.F |
| C188 | | CE73FE1.3 234 | CHIP C | 0.010.F |
| C189, 191 | | CE73FE1.3 234 | CHIP C | 0.010.F |
| C192, .54 | | CE73FE1.3 234 | CHIP C | 5.0FF |
| C195, .56 | | CE73FE1.3 234 | CHIP C | 0.010.F |
| C197-199 | | CE73FE1.3 234 | CHIP C | 0.010.F |
| C200-202 | | CE73FE1.3 234 | CHIP C | 0.010.F |
| C203 | | CE73FE1.3 234 | CHIP C | 0.010.F |
| C204 | | CE04E1.4470F | ELC187 | 47PF |
| C205-207 | | CE73FE1.3 234 | CHIP C | 0.010.F |
| C208-211 | | CE73FE1.3 234 | CHIP C | 0.010.F |
| C212 | | CE73FE1.3 234 | CHIP C | 0.010.F |
| C213 | | CE04E1.4470F | ELC187 | 47.F |
| C214 | | CE73FE1.3 234 | CHIP C | 0.010.F |
| C215-217 | | CE73FE1.3 234 | CHIP C | 0.010.F |
| C222-226 | | CE73FE1.3 234 | CHIP C | 0.010.F |
| T01 | | C05-0044-05 | TRIMMING CAP(30PF) | |
| T02 | | C05-0051-05 | TRIMMING CAP(30PF) | |
| CN1 | | E40-3239-05 | PIN CONNECTOR(4P) | |
| CN2 | | E40-3237-05 | PIN CONNECTOR(2P) | |
| CN3 | | E40-3239-05 | PIN CONNECTOR(4P) | |
| CN4 | | E40-3239-05 | PIN CONNECTOR(4P) | |
| CN5 | | E40-3237-05 | PIN CONNECTOR(2P) | |
| CN6 | | E40-3239-05 | PIN CONNECTOR(4P) | |
| CN7 | | E40-3239-05 | PIN CONNECTOR(4P) | |
| CN8, 9 | | E40-3237-05 | PIN CONNECTOR(2P) | |
| CN10 | | E04-0154-05 | RF COAXIAL JACK | |
| CN11 | | E40-3237-05 | PIN CONNECTOR(2P) | |
| CN12 | | E40-3241-05 | PIN CONNECTOR(6P) | |
| CN13 | | E40-3242-05 | PIN CONNECTOR(7P) | |
| J1, 2 | | E13-0164-05 | PIN JACK(EXT. ST) | |
| J3 | | E06-0859-05 | PIN SOCKET(SCOPE DIN 8P) | |
| J4 | | E06-0653-05 | PIN SOCKET(ACCI DIN 8P) | |
| TP1, -4 | | E23-0454-05 | TERMINAL | |
| TP5, 6 | | E23-0512-05 | TERMINAL | |
| A1, -4 | | F11-08,7-04 | SHIELDING COVER | |
| CF1 | | L72-0350-05 | CERAMIC FILTER(9.295MHZ) | |
| CF2 | | L72-0363-05 | CERAMIC FILTER(10.695MHZ) | |
| L1, 2 | | L40-1011-14 | SMALL FIXED INDUCTOR(100UH) | |
| L3 | | L32-0197-05 | OSCILLATING COIL (VCO) | |
| L4 | | L40-1011-14 | SMALL FIXED INDUCTOR(100UH) | |
| L5 | | L40-1011-14 | SMALL FIXED INDUCTOR(100UH) | |
| L6 | | L40-1011-14 | SMALL FIXED INDUCTOR(100UH) | |
| L7 | | L40-1011-14 | SMALL FIXED INDUCTOR(100UH) | |
| L8, 9 | | L40-1011-14 | SMALL FIXED INDUCTOR(100UH) | |
| L10 | | L32-0639-05 | OSCILLATING COIL (VCO) | |
| L11 | | L40-1011-14 | SMALL FIXED INDUCTOR(100UH) | |
| L12, 13 | | L40-2711-17 | SMALL FIXED INDUCTOR(220UH) | |

P: Standard type K: LSA P: Graph M: Metal

U: 200Fur L: 100Fur Y: Ergane M: 100Fur

UE: At 15' type X: Antenna

A: Indicates safety critical components

PARTS LIST

* 1000 - 0013

Parts in bold Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teil ohne Parts No. werden nicht geliefert.

| Ref. No.
参照番号 | Address Map
位置 | Parts No.
部品番号 | Description
部品名/記号 | Dist. Re-
mains
仕 欠 有 |
|------------------|-------------------|-------------------|------------------------------|-----------------------------|
| L14 | * | L34-4204-15 | TUNING COIL | |
| L15 | 16 | L40-1011-14 | SMALL FIXED INDUCTOR (100UH) | |
| L17 | | L32-0639-05 | OSCILLATING COIL (40UH) | |
| L18 | | L40-1011-14 | SMALL FIXED INDUCTOR (100UH) | |
| L19 | 20 | L40-2211-17 | SMALL FIXED INDUCTOR (220UH) | |
| L21 | * | L34-4204-15 | TUNING COIL | |
| L22 | 23 | L40-1011-14 | SMALL FIXED INDUCTOR (100UH) | |
| L24 | | L32-0639-05 | OSCILLATING COIL (40UH) | |
| L25 | 26 | L40-1201-17 | SMALL FIXED INDUCTOR (12UH) | |
| L27 | 28 | L40-6611-14 | SMALL FIXED INDUCTOR (66UH) | |
| L29 | | L40-1011-14 | SMALL FIXED INDUCTOR (100UH) | |
| L31 | 31 | L40-1021-14 | SMALL FIXED INDUCTOR (10UH) | |
| L32 | | L40-1011-14 | SMALL FIXED INDUCTOR (100UH) | |
| L33 | | L40-4701-17 | SMALL FIXED INDUCTOR (47UH) | |
| L35 | | L40-6681-17 | SMALL FIXED INDUCTOR (66UH) | |
| L36 | | L40-1011-14 | SMALL FIXED INDUCTOR (100UH) | |
| L37 | 38 | L40-1201-17 | SMALL FIXED INDUCTOR (12UH) | |
| L39 | 40 | L40-6691-17 | SMALL FIXED INDUCTOR (66UH) | |
| L41 | 42 | L40-1011-14 | SMALL FIXED INDUCTOR (10UH) | |
| X1 | | L77-0963-15 | CRYSTAL RESONATOR 20MHZ | |
| X2 | | L77-1394-15 | TCXO 20MHZ | C |
| R1 | 144 | RK73FB2AXXJ | CHIP R | |
| W3 | | R92-0571-15 | CHIP RES 0.1W | |
| S1 | | S31-1411-05 | SLIDE SWITCH | |
| S2 | * | S31-2421-05 | SLIDE SWITCH | |
| D1 | | 3LS73 | 0-12 DIGIT | |
| D2 | | 1SV166 | CHIP DIE | |
| D3 | | 3LS73 | 0-12 DIGIT | |
| D4 | | 1SV166 | CHIP DIE | |
| D5 | | 3LS73 | 0-12 DIGIT | |
| D6 | | 1SV166 | CHIP DIE | |
| D7 | | 3LS73 | 0-12 DIGIT | |
| D8 | 5 | 1SV166 | CHIP DIE | |
| D10 | | 3LZ123 | 0-12 ZENER DIODE (12V) | |
| D11 | 13 | 3AP202(K) | CHIP DIE | |
| D14 | | 3LS73 | DIE | |
| D15 | | 3LZ16.00 | CHIP ZENER DIODE 6.0V | |
| IC1 | | CX-79250 | DIGITAL SELECT PLL | |
| IC2 | | W54459L | DIV 1/100 | |
| IC3 | | CX-79250 | DIGITAL SELECT PLL | |
| IC4 | | W54459L | DIV 1/100 | |
| IC5 | | SM169.3P | DUAL BALANCED MIXERS | |
| IC6 | | CX-79250 | DIGITAL SELECT PLL | |
| IC7 | | W54459L | DIV 1/100 | |
| IC8 | | SM169.3P | DUAL BALANCED MIXERS | |
| IC9 | | CX-79250 | DIGITAL SELECT PLL | |
| IC10, 11 | | SM169.3P | DUAL BALANCED MIXERS | |
| IC12 | | W54459L | DIV 1/100 | |
| IC13 | * | MC145600CP | PLL | |
| IC14 | * | W74LS307 | DIV | |
| IC14 | | SM169.3P | DUAL | |
| IC15 | | TC4012BP | 8-INPUT FLIP FLOP X2 | |
| IC16 | | MC145600CP | PLL | |

E. Sargent & Lundy E. USA P. Canada W. Europe

U. Pacific East Hawaii T. England M. Japan

NE. Africa/Europe A. Australia

△ indicates safety critical components.

PARTS LIST

New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

To a Parts No. without a "N" is not supplied.

| Ref. No. | Address | Parts No. | Description | Dist. Re-
nation |
|---|---------|--------------|-----------------|---------------------|
| 参照番号 | 位置 | 部品番号 | 部品名 / 説明 | 仕向備考 |
| IC1 | | 7C45546P | IC | |
| Q1 2 | | 2SC2712(Y) | C-17 TRANSISTOR | |
| Q3 | | 2SC2714(Y) | CHIP TRANSISTOR | |
| Q4 | | 2SC2712(Y) | CHIP TRANSISTOR | |
| Q5 12 | | 2SC2714(Y) | C-17 TRANSISTOR | |
| Q6 12 | | 2SC2712(Y) | C-17 TRANSISTOR | |
| Q7 13 | | 2SC2714(Y) | CHIP TRANSISTOR | |
| Q8 13 | | 2SC2712(Y) | CHIP TRANSISTOR | |
| Q9 10 | | 2SC2712(Y) | C-17 TRANSISTOR | |
| Q10 | | 2SA162(Y) | CHIP TRANSISTOR | |
| | | X59-3440-00 | MECHANICAL UNIT | |
| | | X59-3450-01 | MECHANICAL UNIT | |
| | | X59-3442-00 | MECHANICAL UNIT | |
| | | X59-3452-00 | MECHANICAL UNIT | |
| FILTER UNIT (C61-3000-JC) -M: TS-950S (M) -F: TS-950S (F) -G: TS-950S (G) -H: TS-950S (H) | | | | |
| C1 13 | | CC45SL1H032 | CERAMIC | 0.010F Z |
| C2 15 | | CC45SL1H103H | ELECTRO | 10F 25mV |
| C16 | | C61-01-3-05 | CERAMIC | 1.47UF K |
| C17 | | CC45C-2-010C | CERAMIC | 1.0PF C |
| C18 | | CC45CH1H032 | CERAMIC | 56PF J |
| C19 | | CC45CH1H101J | CERAMIC | 10PF J |
| C20 21 | | C91-0119-05 | CERAMIC | 1.47UF K |
| C22 | | CC45SL1H150 | CERAMIC | 15PF J |
| C23 | | CC45F1H1012 | CERAMIC | 0.010F Z |
| C101 | | C9102H102 | WCA | 100PF J |
| C102 | | CC45SL1H1312 | CERAMIC | 430PF J |
| C103 | | C9102-222J | WCA | 2200PF J |
| C104 | | CC45SL1H222J | CERAMIC | 220PF J |
| C105 | | C9102H122 | WCA | 1200PF J |
| C106, C7 | | CC45SL2H131C | CERAMIC | 330PF J |
| C108 | | CC45SL2H241C | CERAMIC | 240PF J |
| C109 | | C9102H122 | WCA | 1200PF J |
| C110 | | CC45SL2H470J | CERAMIC | 47PF J |
| C111 | | CC45SL2H160C | CERAMIC | 16PF J |
| C112 | | CC45SL2H391C | CERAMIC | 39PF J |
| C113 | | CC45SL2-22J | CERAMIC | 220PF J |
| C114 | | CC45SL2-24J | CERAMIC | 240PF J |
| C115 | | CC45SL2H121C | CERAMIC | 120PF J |
| C116 | | CC45SL2H101C | CERAMIC | 100PF J |
| C117 | | CC45SL2-33J | CERAMIC | 330PF J |
| C118 | | CC45SL2-560J | CERAMIC | 56PF J |
| C119 | | CC45SL2H331J | CERAMIC | 330PF J |
| C120 | | CC45SL2H151C | CERAMIC | 150PF J |
| C121 | | CC45SL2-10J | CERAMIC | 100PF J |
| C122 | | CC45SL2-139J | CERAMIC | 390PF J |
| C123 | | CC45SL2H760J | CERAMIC | 76PF J |
| C124 | | CC45SL2H241C | CERAMIC | 240PF J |
| C125 | | CC45SL2-10J | CERAMIC | 100PF J |
| C126 | | CC45SL2H470J | CERAMIC | 47PF J |
| C127 | | CC45SL2H301C | CERAMIC | 300PF J |
| C128 | | CC45SL2H241C | CERAMIC | 240PF J |
| C129 | | CC45SL2-22J | CERAMIC | 220PF J |
| C130 | | CC45SL2H101J | CERAMIC | 100PF J |
| C131 | | CC45SL2H330C | CERAMIC | 33PF J |
| C132 | | CC45SL2-22J | CERAMIC | 220PF J |

E: Standard & Europe K: USA F: Canada W: Japan

J: Japan East, Hong Kong T: Taiwan M: Mainland China

UE: Australia X: Other

A: Accessory parts and components

PARTS LIST

W New Parts

Parts without Parts No. are not supplied

Les pièces non mentionnées sans le Parts No ne sont pas fournies

Teile ohne Parts No werden nicht geliefert

| Ref. No.
参照番号 | Address
住所 | Parts No.
部品番号 | Description
部品名/規格 | Quantity
数量 | Destination
行 |
|------------------|---------------|-------------------|-----------------------------|----------------|------------------|
| C133 | | CC45SL2H1000 | CERAMIC | 10PF | |
| C134 | | CC45SL2H1217 | CERAMIC | 120PF | |
| C135 | | CC45SL2H020J | CERAMIC | 82PF | |
| C136 | | CC45SL2H100J | CERAMIC | 33PF | |
| C137 | | CC45SL2H151J | CERAMIC | 150PF | |
| C138 | | CC45SL2H1000 | CERAMIC | 10PF | |
| C139 | | CC45SL2-820J | CERAMIC | 82PF | |
| C140 | | CC45SL2H151J | CERAMIC | 150PF | |
| C141, 142 | | CC45SL2-470J | CERAMIC | 47PF | |
| C143 | | CC45SL2H390J | CERAMIC | 39PF | |
| C144 | | CC45SL2-470J | CERAMIC | 47PF | |
| C01 | | CD5-0030-15 | TRIMMING CAP(20PF) | | |
| CN1, 2 | | ED4-0157-05 | RF COAXIAL JACK | | |
| CN3 | | ED4-3237-05 | RF CONNECTOR(2P) | | |
| CN4 | | ED4-0157-15 | RF COAXIAL JACK | | |
| CN5 | | ED4-3238-05 | RF CONNECTOR(2P) | | |
| CN6 | | ED4-3242-05 | PIN CONNECTOR(5P) | | |
| CN7 | | ED4-5047-05 | RF CONNECTOR(10P) | | |
| CN8 | | ED4-3242-05 | PIN CONNECTOR(5P) | | |
| CN10, 11 | | ED4-057-05 | RF CONNECTOR | | S |
| CN12, 13 | | ED4-057-05 | PIN CONNECTOR | | |
| CN23 | | ED4-6080-05 | RF CONNECTOR | | |
| C01 | | L72-0133-05 | CERAMIC FILTER(CF)4.5(1.2) | | S |
| L1 | | L39-0405-05 | TYPICAL COIL | | |
| L2, 8 | | L40-1011-14 | SMALL FIXED INDUCTOR(10.0H) | | |
| L9, 10 | | L40-1021-14 | SMALL FIXED INDUCTOR(10H) | | |
| L11 | | L40-1011-14 | SMALL FIXED INDUCTOR(100H) | | |
| L12, 13 | | L24-0541-05 | TUNING COIL | | |
| L102 | | L39-0454-05 | TYPICAL COIL (3.4H) | | |
| L103 | | L39-0457-05 | TYPICAL COIL (4.5H) | | |
| L104 | | L39-0458-05 | TYPICAL COIL (1.9H) | | |
| L105 | | L39-0459-05 | TYPICAL COIL (2.4H) | | |
| L106 | | L39-0460-05 | TYPICAL COIL (1.0H) | | |
| L107 | | L39-0461-05 | TYPICAL COIL (1.2H) | | |
| L108 | | L39-0462-05 | TYPICAL COIL (0.7H) | | |
| L109 | | L39-0463-05 | TYPICAL COIL (0.9H) | | |
| L110 | | L34-1278-05 | COIL | 9.7 0.5T | |
| L111 | | L34-1277-05 | COIL | 9.7 0.5T | |
| L112 | | L34-1280-05 | COIL | 9.7 0.5T | |
| L113 | | L34-1279-05 | COIL | 9.7 0.5T | |
| L114 | | L34-1282-05 | COIL | 9.7 0.5T | |
| L115 | | L34-1281-05 | COIL | 9.7 0.5T | |
| T1 | | L92-0102-05 | TYPICAL CASE | | |
| T2, 6 | | L92-0104-05 | TYPICAL | T6E 2 | |
| T3, 9 | | L92-0105-05 | TYPICAL | T6E 6 | |
| XF | | L71-0256-05 | PCF-0.8(100-2) | | |
| CP1 | | R90-0204-05 | VULTI-COMP | 4.7KX4 | |
| CP2 | | R90-0205-05 | VULTI-COMP | 4.7KX8 | 1/4W |
| CP3 | | R90-0206-05 | VULTI-COMP | 0.1FX9 | |
| R1 | | RD14CB2E270J | R1 | 27 | 1/4W |
| R2 | | RD14CB2E330J | R2 | 33 | 1/4W |
| R3 | | RD14CB2E100J | R3 | 10 | 1/4W |
| R4 | | RD14CB2E100J | R4 | 10 | 1/4W |
| R5 | | RD14CB2E470J | R5 | 47 | 1/4W |

E Scandinavia & Europe K USA P Canada W Japan

J Pacific East Hawaii T England M Africa

UE Americas/Latin America X Australia

Indicates extra critical components

PARTS LIST

* New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teil ohne Parts No. werden nicht geliefert.

| Ref. No.
部品番号 | Address
位置 | Parts No.
部品番号 | Description
部品名 / 規格 | Disti- Re-
nasion ns ka
行 向 番号 |
|--|---------------|---|---|---|
| VP1
W. 2
W22
W24 | | R12-0104-25
R52-0150-25
R52-0157-05
R52-0157-25 | 25.0MΩ -ST. 220
JUMPER RES. 0.5W
JUMPER RES. 0.5W
JUMPER RES. 0.5W | |
| K1 14
K15 | | SS1 1420-05
SS - 425-25 | RTLAY
RELAY | |
| D1 -7
D8 .9
D10
J1 .2
C.1 .4 | | IS1535
SS101
IS1535
MCY21
IS1535 | 0130E
0130E
0130E
0130E
0130E | |
| D18
IC1
IC1
IC2
IC3 | | ES7-201M
74LS145M
74LS145
F54581P
M78105 | 0130E
IC(BCD-DECIMAL)
IC(BCD-DECIMAL)
IC(INVERTER)
IC(5V REG) | |
| C1 | | 2SA62 Y1 | TRANSISTOR | |
| CONTROL UNIT (X53-3238-00) | | | | |
| C1
C2
C3
C4
C5 | | CE04E C.100V
CE04E C.220V
CE04E MIC102M
CE04E MIC103P
CE04E MIC102M | ELECT-C
ELECTRO
ELECTRO
ELECTRO
ELECTRO | 100F 16V
220F 16V
1000UF 16V
1.0UF 50V
10UF 50V |
| C6
C7
C8
C9
C10 1. | | C97-1646-05
CE04E C.422V
CE04E MIC101M
CE04E C.010V
CE04E C.100V | ELECTRO
ELECTRO
ELECTRO
ELECTRO
ELECTRO | 470UF 6.3V
220UF 10V
100UF 16V
1UF 50V
10UF 16V |
| C12
C13 14
C14
C16
C17 | | CK73EF C.1052
CE04E C.0.1V
CE04E MIC14R7M
CE04E C.4470V
CE04E MIC100M | CHIP C
ELECTRO
ELECTRO
ELECTRO
ELECTRO | 1.0UF Z
10UF 16V
4.7UF 50V
47UF 10V
10UF 16V |
| C18
C19
C20 -23
C24
C25 -26 | | CE04E C.4470V
CK73FIC10-2
CK73F91-103X
CK73F91-103J
CK73F81PXXXX | ELECTRO
CHIP C
CHIP C
CHIP C
CHIP C | 47UF 10V
1.0UF Z
0.010UF X
100PF Z |
| C27
C28
C29 -32
C34
C35 -39 | | CK73F91-104Z
CK73F1E474Z
CK73F3-XX4
CK73F3-104Z
CK73F81PXXXX | CHIP C
CHIP C
CHIP C
CHIP C
CHIP C | 0.10UF Z
0.10UF Z
0.10UF Z
0.10UF Z
0.10UF Z |
| C40 -43
C44 -49
C50 51
C52
C53 | | CK73F91-104Z
CK73F81HXXXX
CK73F81H101Z
CK73F81H103K
CK73F81H563E | CHIP C
CHIP C
CHIP C
CHIP C
WYLER | 0.10UF Z
0.10UF Z
100PF J
0.010UF K
0.056UF X |
| C54 -58
C59
C60
C61 | | CK73F81HXXXX
CE04E MIC1047M
CK73F1E104Z
CK452-123E | CHIP C
ELECTRO
CHIP C
CERAMIC | 47UF 16V
0.10UF Z
0.010UF K |
| CH. | | E40-3238-05 | PCA CONNECTOR 3P | |

E. Sanyo Electric Co. Ltd. U.S.A. P. Canada W. Europe

U.K. France East. Europe J. England M. Other Areas

U.S.A. America X. Australia

A indicates safety critical components

PARTS LIST

Key Parts

Parts without Parts No. are not supplied

As an exception, most cross parts in Parts No. are not supplied

To obtain Parts No. please refer to the following

| Ref. No. | Address | Parts No. | Description | Desti- Re-
nation marks |
|----------|---------|--------------|-------------------------------|----------------------------|
| 参照番号 | 電 区 | 部品番号 | 部品名 / 規格 | 仕 向 備考 |
| CN2 .2 | | E40-3231-05 | PIN CONNECTOR (2P) | |
| CN4 | | E40-3236-05 | PIN CONNECTOR (3P) | |
| CN5 .4 | | E40-3231-05 | PIN CONNECTOR (2P) | |
| CN7 | | E40-3240-05 | PIN CONNECTOR (5P) | |
| CN8 | | E40-3242-05 | PIN CONNECTOR (7P) | |
| CN9 | | E40-3236-05 | PIN CONNECTOR (3P) | |
| CN10 | | E40-3241-05 | PIN CONNECTOR (5P) | |
| CN11 | | E40-3236-05 | PIN CONNECTOR (3P) | |
| CN12 | | E40-3231-05 | PIN CONNECTOR (2P) | |
| CN13 | | E40-3236-05 | PIN CONNECTOR (3P) | |
| CN14 .5 | | E40-3231-05 | PIN CONNECTOR (2P) | |
| CN16 | | E40-3240-05 | PIN CONNECTOR (5P) | |
| CN17 | | E40-3231-05 | PIN CONNECTOR (2P) | |
| CN18 | | E40-3241-05 | PIN CONNECTOR (5P) | |
| CN19 | | E40-5131-05 | PIN CONNECTOR (1P) | |
| CN20 | * | E40-5331-05 | PIN CONNECTOR (1P) | |
| CN21 | | E40-3231-05 | PIN CONNECTOR (2P) | |
| CN22 | | E40-3241-05 | PIN CONNECTOR (5P) | |
| CN23 | | E40-3231-05 | PIN CONNECTOR (2P) | |
| CN24 | | E40-3236-05 | PIN CONNECTOR (3P) | |
| CN25 | | E40-3241-05 | PIN CONNECTOR (5P) | |
| CN26 | | E40-3236-05 | PIN CONNECTOR (3P) | |
| CN27 | * | E40-0511-05 | PIN CONNECTOR (6P) | |
| CN28 | * | E40-5331-05 | PIN CONNECTOR (1P) | |
| CN29 | * | E40-5331-05 | PIN CONNECTOR (3P) | |
| CN30 | | E40-0317-05 | PIN CONNECTOR (3P) | |
| CN31 | | E40-3241-05 | PIN CONNECTOR (5P) | |
| CN32, 33 | | E23-0512-05 | TERMINAL | |
| | * | F02-0431-04 | HEAT SHOCK CAP/ADDITION TYPE1 | |
| | | G02-0574-04 | FLAT SPRING | |
| L1 | | L40-0011-14 | SMALL FIXED INDUCTOR (0.01H) | |
| L2 | | L40-3391-13 | SMALL FIXED INDUCTOR (0.01H) | |
| L3 .4 | | L40-0011-14 | SMALL FIXED INDUCTOR (0.01H) | |
| X1 | * | L00-0057-05 | RESONATOR (100KHZ) | |
| R1 -14 | | R473F324XXJ | CHIP R | |
| R15 | | R92-0670-05 | CHIP R | 0.5W |
| R16 -74 | | R473F324XXJ | CHIP R | |
| R17 | | R92-0670-05 | CHIP R | 0.5W |
| R18 -103 | | R473F324XXJ | CHIP R | |
| R104 | | RD14B52022J | R | 2.2K J 1/4W |
| R105 | | R473F324542J | CHIP R | 5.6K J 1/4W |
| R106 | | RD14B52022J | R | 2.2K J 1/4W |
| R107 | | RD14B52022J | R | 2.2K J 1/4W |
| V91 | * | R12-3103-05 | TRIMMING POT. | 47K |
| V92 | * | R12-3103-05 | TRIMMING POT. | 47K |
| V93 -3 | * | R12-3103-05 | TRIMMING POT. | 10K |
| V94 .7 | * | R12-3103-05 | TRIMMING POT. | 47K |
| V95 9 | * | R12-3103-05 | TRIMMING POT. | 10K |
| V96 10 | * | R12-3103-05 | TRIMMING POT. | 47K |
| V97 1 | * | R12-3103-05 | TRIMMING POT. | 10K |
| V98 2 | * | R12-3103-05 | TRIMMING POT. | 47K |
| V99 3 | * | R12-3103-05 | TRIMMING POT. | 23K |
| W1 | | R92-0150-05 | JUMPER RESIST | 0.5W |

E Scandinavia & Europe K USA P Canada W Europe

L PX/Far East Japan T England M Other Areas

UE ANP/SIE/Jepa X Japan

Always safety and security

PARTS LIST

New Parts

Parts shown. Parts No. are not assigned.

Les pièces montrées. Les numéros des pièces ne sont pas attribués.

Zeigten Teile. Teilenummern sind nicht zugeordnet.

| Ref. No.
零件番号 | Address New
位置 | Parts No.
部品番号 | Description
部品名 / 規格 | Designation
位置 角番号 |
|-----------------------|-------------------|-------------------|---------------------------------|-----------------------|
| R6 | | R52-161-05 | CUMPER RESISTOR 50V | |
| 4. | | S31-41-05 | SLIP SWITCH | |
| S2 | | S59-44(2)-05 | SLIP SWITCH | |
| D1 | | LT8201P | DIODE | |
| D2 | | RLZ123 | CHIP ZENER DIODE 2V | |
| D3 | | RL573 | CHIP ZENER DIODE 2.6V | |
| D5 | | RLZ14.75 | CHIP ZENER DIODE 4.7V | |
| D6 | | RL573 | CHIP DIODE | |
| D7 | | NSH5845 | CHIP DIODE | |
| D8 | | RLZ14.75 | CHIP ZENER DIODE 4.7V | |
| D9 | | P-573 | CHIP DIODE | |
| D10, 11 | | JAN202(1) | CHIP DIODE | |
| D12 | | RLZ-58 | CHIP ZENER DIODE 5.8V | |
| D13 -1.6 | | RL573 | CHIP DIODE | |
| D17 | | CA1202(1) | CHIP DIODE | |
| D18 -28 | | RL573 | CHIP DIODE | |
| D29 | | JAN202(1) | CHIP DIODE | |
| D30 -13 | | RL573 | CHIP DIODE | |
| IC1 | | TC4069UP | IC INVERTER X6 | |
| IC2 | | TC4018P | IC NAND X8 | |
| IC3, 4 | | TC4066BP | IC BILATERAL SWITCH X4 | |
| IC5 | | TC4069UP | IC INVERTER X6 | |
| IC6 | | TC4013P | IC NAND X4 | |
| IC7 | | JC2002V | IC AMP X2 | |
| IC8 | | NJH4558P | IC AMP X2 | |
| IC9 | | TC4066BP | IC BILATERAL SWITCH X4 | |
| IC10 | | TC4335B | IC 5-3T MULTI | |
| IC11 | | NJH4558P | IC AMP X2 | |
| IC12 | | AN79M1P | IC VOLTAGE REGULATOR / ASSEMBLY | |
| IC13 | | TC4069UP | IC INVERTER X6 | |
| IC14 | | JC2002V | IC AMP X2 | |
| IC15 | | TC4013P | IC NAND X4 | |
| IC16 | | PS19519E | IC SYSTEM RESET | |
| Q1 -3 | | 2SC27.2 Y | CHIP TRANSISTOR | |
| Q4 | | 2SK2083CP | CHIP FET | |
| Q5 | | 2SC27.2 Y | CHIP TRANSISTOR | |
| Q6 | | DT0144EK | DIGITAL TRANSISTOR | |
| Q7 | | DT0124EK | DIGITAL TRANSISTOR | |
| Q8 | | DT0144EK | DIGITAL TRANSISTOR | |
| Q9 | | DT0124EK | DIGITAL TRANSISTOR | |
| Q10, 11 | | 2SC27.2 Y | CHIP TRANSISTOR | |
| Q12 -17 | | DT0144EK | DIGITAL TRANSISTOR | |
| Q18 | | DT0144EK | DIGITAL TRANSISTOR | |
| Q19 | | DT0144EK | DIGITAL TRANSISTOR | |
| | | X59-3660-00 | MODULE UNIT (CMT) | |
| | | X59-3670-00 | MODULE UNIT (MAP) | |
| | | X59-3680-00 | MODULE UNIT (CMT) | |
| | | X59-3700-00 | MODULE UNIT (ALC) | |
| AT UNIT (X53-3240-00) | | | | |
| C1 | | CG45.2-350J | 1E-4V | 350V |
| C2, 8 | | CG73.5E107E | 1E-4V | 100V |
| C9, 1 | | CG73.5E107E | 1E-4V | 100V |
| C12 | | CG73.5E107E | 1E-4V | 100V |

E: Schneider & Lang, C: KA, P: Grace, M: E: KA

J: F: KA, T: KA, M: KA, M: KA

LE: KA, KA, KA, KA

A: KA, KA, KA, KA

PARTS LIST

* New Parts

Parts without Parts No. are not supplied

Les pièces non mentionnées dans le Parts No. ne sont pas fournies

Teile ohne Parts No. werden nicht geliefert

| Ref. No.
参照番号 | Address No.
位置番 | Parts No.
部品番号 | Description
部品名/規格 | Q'ty
仕 | Re-
vision
備考 |
|------------------|--------------------|-------------------|-----------------------------|-----------|---------------------|
| C13 7 | | CK73FB1E107K | CHIP C | 0.010.F | K |
| C20 | | C304Ea C470M | ELECTRE | 47.F | 50V |
| C21 25 | | CK73FB1E107K | CHIP C | 0.010.F | K |
| C26 | | C304Ea C470M | ELECTRE | 47.F | 50V |
| C27 | | CK73FB1E107K | CHIP C | 0.010.F | K |
| C28 149 | | C472F31-102M | CHIP C | 1000PF | K |
| C31 13 | | CK73FB1E107K | CHIP C | 0.010.F | K |
| C35 | | C304Ea C470M | ELECTRE | 47.F | 50V |
| C36 19 | | CK73FB1E107K | CHIP C | 0.010.F | K |
| C40 | | C472F31-102M | CHIP C | 1000PF | K |
| C41 12 | | CK73FB1E107K | CHIP C | 0.010.F | K |
| C43 | | C472F31-102M | CHIP C | 1000PF | K |
| C44 146 | | CK73FB1E107K | CHIP C | 0.010.F | K |
| C101 109 | | C472F31-102M | CHIP C | 1000PF | K |
| C | | C05-001-1 | TRIMMING CAP.(10PF) | | |
| VC 12 | | C02-0.22-15 | VARIABLE CAPACITOR | | |
| A3 | | D40 0633-13 | GEAR ASSY | | |
| CN 12 | | E04-0157-15 | RF COAXIAL JACK | | |
| CN3 | | E40-3239-05 | PIN CONNECTOR(4P) | | |
| CN4 | | E40-3247-15 | PIN CONNECTOR(5P) | | |
| CN5 | | E40-3239-05 | PIN CONNECTOR(4P) | | |
| CN11 | | E40 5165-15 | PIN CONNECTOR(9P) | | |
| A2 | 14 | F10-143-11 | SHIELDING PLATE | | |
| A1 | 14 | F11-142-12 | SHIELDING COVER | | |
| A3 | 14 | F11-143-14 | SHIELDING COVER A | | |
| A4 | 24 | F11-144-14 | SHIELDING COVER B | | |
| L1 | | L39-0416-05 | TRIDAL COIL | | |
| L2 | | L39-04 3-15 | TRIDAL COIL | | |
| L3 16 | | L40-101-1 | SMALL FIXED INDUCTOR(100UH) | | |
| L7 13 | | L40-101-14 | SMALL FIXED INDUCTOR(100UH) | | |
| L14 1 | | L40 101-11 | SMALL FIXED INDUCTOR(100UH) | | |
| L101 10 | | L40-101-14 | SMALL FIXED INDUCTOR(100UH) | | |
| L11 9 | | L34-1216-05 | TRIDAL COIL | | |
| L111 | | L39 0473-15 | TRIDAL COIL | | |
| L112 | | L34-2216-05 | TRIDAL COIL | | |
| L112 | | L39-0473-15 | TRIDAL COIL | | |
| T 12 | | L91-013-05 | TRIDAL CORE | | |
| T110 12 | | L92-017-15 | TRIDAL CORE | | |
| S | 14, 1N | M01 3006-44 | BRASSER HEAD TAPITE SCREW | | |
| S | 14, 2N | M06-3006-46 | FLAT HEAD TAPITE SCREW | | |
| R1 12 | | R12-344-115 | TRIMMING POT. | | |
| R3 | | R014B323100J | RF | 100 | 1/4W |
| R4 | | CK73FB2A102K | CHIP C | 1.1K | 1/10W |
| R5 121 | | R014B323100J | RF | 47 | 1/4W |
| R24 125 | | CK73FB2AXXK | CHIP C | | |
| R26 121 | | R014B323100J | RF | 10 | 1/4W |
| R29 | | CK73FB2AXXK | CHIP C | | |
| R30 137 | | R014B323100J | RF | 470 | 1/4W |
| R35 | | CK73FB2AXXK | CHIP C | | |
| R35 | | R014B323100J | RF | 4.7K | 1/4W |
| R37 50 | | CK73FB2AXXK | CHIP C | | |
| VR1 | | R12 3126-15 | TRIMMING POT.10K | | |

E: Scandinavia Europe C: USA P: Canada W: Japan

U: Switzerland T: France M: Other Areas

UE: Australia X: Asian

△ denotes safety critical components

PARTS LIST

* New Parts

Parts marked with * are new parts.

Parts marked with * are new parts.

Parts marked with * are new parts.

| Ref. No. | Address | Part No. | Description | Destination | Remarks |
|---------------------------|---------|--------------|-----------------------|-------------|---------|
| 参照番号 | 位置 | 部品番号 | 部品名/規格 | 比 向 | 備考 |
| V82 | | P12-3.28-01 | TRIMMING POT. 21K | | |
| V83 | | P12-3.28-01 | POT. 21K | | |
| V84 | | P12-3.28-01 | POT. 21K | | |
| V85 | | P12-3.28-01 | POT. 21K | | |
| V86 | | P12-3.28-01 | POT. 21K | | |
| K1 | | S51-2427-01 | RELAY | | |
| K10 | | S51-1442-01 | RELAY | | |
| M1 | | T82-1413-01 | IC DRIVER ASSY | | |
| S1 | | 156C | DIODE | | |
| D3 | | ISS224 | CHIP DIODE | | |
| D9 | | 156C | DIODE | | |
| D13 | | ISS224 | CHIP DIODE | | |
| D101-108 | | S155 | DIODE | | |
| IC1 | | 5474578A | IC | | |
| IC2 | | 741658P | IC ANALOG/DIGITAL SV. | | |
| IC4 | | 846109U2 | IC METER DRIVER | | |
| IC6 | | MLP2903S | IC DUAL COMPARATOR | | |
| IC7 | | MLP2904S | IC DUAL COMPARATOR | | |
| IC8 | | MLP2903S | IC DUAL COMPARATOR | | |
| IC9 | | MLP2903S | IC DUAL COMPARATOR | | |
| Q1 | | 2SC2714A | CHIP TRANSISTOR | | |
| Q3 | | 2SC143K | DIGITAL TRANSISTOR | | |
| Q4 | | 2SA1204A | CHIP TRANSISTOR | | |
| Q5 | | 2SC143K | DIGITAL TRANSISTOR | | |
| Q7 | | 2SA1204A | CHIP TRANSISTOR | | |
| Q8 | | 2SC143K | DIGITAL TRANSISTOR | | |
| DISPLAY UNIT (X14-500-01) | | | | | |
| C1 | | C304E4.3470V | ELECTRO | 470P | 250V |
| C2 | | C304E4.3470V | ELECTRO | 470P | 50V |
| C4 | | C304E4.3470V | ELECTRO | 470P | 100V |
| C6 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C7 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C9 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C11 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C12 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C13 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C14 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C15 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C16 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C17 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C18 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C19 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C20 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C21 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C22 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C23 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C24 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C25 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C26 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C27 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C28 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C29 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C30 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C31 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C32 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C33 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C34 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C35 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C36 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C37 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C38 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C39 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C40 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C41 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C42 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C43 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C44 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C45 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C46 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C47 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C48 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C49 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C50 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C51 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C52 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C53 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C54 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C55 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C56 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C57 | | C473F3.3.03K | CHIP C | 0.010UF | K |
| C58 | | C473F3.3.03K | CHIP C | 0.010UF | K |

* Scantron & Europe: USA, P. Europe, W. Europe

U. Europe, E. Europe, T. Europe, M. Europe, A. Europe

U. Europe, E. Europe, T. Europe, M. Europe, A. Europe

A. Europe, S. Europe, W. Europe

PARTS LIST

* New Parts

Parts without Part No. are not stocked.

Les articles qui ne sont pas mentionnés dans la liste des pièces ne sont pas fournis.

The listed Parts No. without * in this list are not stocked.

| Ref. No.
参照番号 | Address No.
位置番号 | Parts No.
部品番号 | Description
部品名/規格 | Desti-
nation
仕向 |
|---------------------------|---------------------|-------------------|-------------------------------|------------------------|
| C59 -60 | | CX73FB1H472F | C-TP C | |
| C61 | | C9 -0431-15 | WELAR 29107F | |
| C62 -63 | | CX73FB1H472F | C-TP C | |
| C64 -65 | | C473FE1.3.134 | CHIP C | |
| C66 | | C204EM1A471M | ELECTR9 4.0LF 10mV | |
| CN1 | | E40-5133-15 | IPC CONNECTION (5P) | |
| CN2 -4 | | E40-3237-05 | PIN CONNECTION (2P) | |
| CN3 | | E40-5034-15 | 2.5 CONNECTION (10P) | |
| CN6 | | E40-3247-05 | PIN CONNECTION (4P) | |
| CN7 | | E40-3241-15 | 2.5 CONNECTION (6P) | |
| | | * 319-1435-03 | HOLDER | |
| L1 | | L40-10.1-13 | SMALL FIXED INDUCTOR (10.0U) | |
| L2 | | L40-10.1-14 | SMALL FIXED INDUCTOR (10.0U) | |
| L3 | | L40-10.1-13 | SMALL FIXED INDUCTOR (10.0U) | |
| X1 | | L77-1282-05 | CRYSTAL RESONATOR (1.0532MHZ) | |
| CP1 | | R60-0008-05 | MULTI-COMP | |
| R1 -2 | | R3-4832C282C | RC 2.2 | 1/6W |
| R3 -460 | | R473FE2A47XJ | CHIP R | |
| VR | | R12-3128-05 | TIMING RES. 22K | |
| A1 | | R92-0150-05 | JUMPER RES. 0 OHM | |
| V4 -3 | | R92-0579-05 | CHIP R | 0 OHM |
| V6 -9 | | R92-0670-05 | CHIP R | 0 OHM |
| V10 | | R92-1061-05 | JUMPER RES. 0 OHM | |
| U1 | | R-23110 | CHIP 23MCP 01928 (11V) | |
| IC | | * 64718CX2FS61BE1 | IC (SUE CPL) | |
| IC2 -3 | | * ME622180PF | IC (GATE ARRAY) | |
| IC4 | | * TC74HC130AF | IC (CHIP SELECT) | |
| IC5 -6 | | * TC74HC574AF | IC (LATCH) | |
| IC7 | | * TC74HC04AF | IC (INVERTER) | |
| IC8 | | * TC74HC00AF | IC (NAND) | |
| IC9 | | * TC74HC175AF | IC (LATCH) | |
| IC10 | | * TC4011BF | IC (NAND 4) | |
| Q1 -10 | | * 2SA1163(GR) | CHIP TRANSISTOR | |
| Q2 | | * 2SA1201(E) | CHIP TRANSISTOR | |
| Q22 -25 | | * 2SA1163(GR) | CHIP TRANSISTOR | |
| Q26 | | * 2SA1201(E) | CHIP TRANSISTOR | |
| Q27 -42 | | * 2SA1163(GR) | CHIP TRANSISTOR | |
| Q43 -52 | | * 2SA1163(GR) | CHIP TRANSISTOR | |
| Q63 -76 | | * 2SA1163(GR) | CHIP TRANSISTOR | |
| Q77 -84 | | FWG1 | D.C.TA. TRANSISTOR | |
| Q85 -90 | | * 2SA1163(GR) | CHIP TRANSISTOR | |
| Q91 -93 | | * 2SA1163(GR) | CHIP TRANSISTOR | |
| Q94 | | FWG1 | DIGITAL TRANSISTOR | |
| Q95 -103 | | * 2SA1163(GR) | CHIP TRANSISTOR | |
| Q104 | | FWG1 | DIGITAL TRANSISTOR | |
| Q105 -1.2 | | * 2SA1163(GR) | CHIP TRANSISTOR | |
| Q113 -1.6 | | * 2SA1163(GR) | CHIP TRANSISTOR | |
| Q1.7 | | * 2SA1201(E) | CHIP TRANSISTOR | |
| Q118 -133 | | * 2SA1163(GR) | CHIP TRANSISTOR | |
| Q142 -137 | | * 2SA1163(GR) | CHIP TRANSISTOR | |
| V1 | | * EIP254M-2C | VACUUM TUBE | |
| SIGNAL UNIT (X57-3380-00) | | | | |
| C1 -4 | | C473FE1.3.142 | CHIP C | 0.100F Z |

E: Schenectady & Europe E: USA F: Canada W: Japan

U: UK (for East Europe) T: England M: Other Areas

A: AF (SE Asia) X: Australia

Δ indicates safety critical components

PARTS LIST

Refer to

parts without Parts No. are not included.

Parts marked with * are optional parts.

The parts marked with * are not included in the parts list.

| Ref. No. | Address | Parts No. | Description | Qty. |
|----------|---------|-------------|-------------|------|
| 参照番号 | アドレス | 部品番号 | 部品名/規格 | 数量 |
| 5 | | CK73F1E1042 | CHIP | 1 |
| 6 | 23 | CK73F1E1042 | CHIP | 1 |
| 131 | | CK73F1E1042 | CHIP | 1 |
| 132 | | CK73F1E1042 | CHIP | 1 |
| 133 | | CK73F1E1042 | CHIP | 1 |
| 134 | | CK73F1E1042 | CHIP | 1 |
| 135 | | CK73F1E1042 | CHIP | 1 |
| 136 | | CK73F1E1042 | CHIP | 1 |
| 137 | | CK73F1E1042 | CHIP | 1 |
| 138 | | CK73F1E1042 | CHIP | 1 |
| 139 | | CK73F1E1042 | CHIP | 1 |
| 140 | | CK73F1E1042 | CHIP | 1 |
| 141 | 42 | CK73F1E1042 | CHIP | 1 |
| 142 | 44 | CK73F1E1042 | CHIP | 1 |
| 143 | 45 | CK73F1E1042 | CHIP | 1 |
| 144 | | CK73F1E1042 | CHIP | 1 |
| 145 | | CK73F1E1042 | CHIP | 1 |
| 146 | | CK73F1E1042 | CHIP | 1 |
| 147 | | CK73F1E1042 | CHIP | 1 |
| 148 | | CK73F1E1042 | CHIP | 1 |
| 149 | | CK73F1E1042 | CHIP | 1 |
| 150 | 52 | CK73F1E1042 | CHIP | 1 |
| 151 | 54 | CK73F1E1042 | CHIP | 1 |
| 152 | 55 | CK73F1E1042 | CHIP | 1 |
| 153 | | CK73F1E1042 | CHIP | 1 |
| 154 | | CK73F1E1042 | CHIP | 1 |
| 155 | | CK73F1E1042 | CHIP | 1 |
| 156 | | CK73F1E1042 | CHIP | 1 |
| 157 | 59 | CK73F1E1042 | CHIP | 1 |
| 158 | | CK73F1E1042 | CHIP | 1 |
| 159 | | CK73F1E1042 | CHIP | 1 |
| 160 | | CK73F1E1042 | CHIP | 1 |
| 161 | | CK73F1E1042 | CHIP | 1 |
| 162 | 64 | CK73F1E1042 | CHIP | 1 |
| 163 | | CK73F1E1042 | CHIP | 1 |
| 164 | | CK73F1E1042 | CHIP | 1 |
| 165 | | CK73F1E1042 | CHIP | 1 |
| 166 | | CK73F1E1042 | CHIP | 1 |
| 167 | | CK73F1E1042 | CHIP | 1 |
| 168 | | CK73F1E1042 | CHIP | 1 |
| 169 | | CK73F1E1042 | CHIP | 1 |
| 170 | | CK73F1E1042 | CHIP | 1 |
| 171 | | CK73F1E1042 | CHIP | 1 |
| 172 | 73 | CK73F1E1042 | CHIP | 1 |
| 173 | | CK73F1E1042 | CHIP | 1 |
| 174 | | CK73F1E1042 | CHIP | 1 |
| 175 | | CK73F1E1042 | CHIP | 1 |
| 176 | | CK73F1E1042 | CHIP | 1 |
| 177 | | CK73F1E1042 | CHIP | 1 |
| 178 | | CK73F1E1042 | CHIP | 1 |
| 179 | | CK73F1E1042 | CHIP | 1 |
| 180 | 8 | CK73F1E1042 | CHIP | 1 |
| 181 | 87 | CK73F1E1042 | CHIP | 1 |
| 182 | 89 | CK73F1E1042 | CHIP | 1 |
| 183 | | CK73F1E1042 | CHIP | 1 |
| 184 | | CK73F1E1042 | CHIP | 1 |
| 185 | | CK73F1E1042 | CHIP | 1 |
| 186 | | CK73F1E1042 | CHIP | 1 |
| 187 | | CK73F1E1042 | CHIP | 1 |
| 188 | | CK73F1E1042 | CHIP | 1 |
| 189 | | CK73F1E1042 | CHIP | 1 |
| 190 | | CK73F1E1042 | CHIP | 1 |
| 191 | | CK73F1E1042 | CHIP | 1 |
| 192 | 96 | CK73F1E1042 | CHIP | 1 |
| 193 | | CK73F1E1042 | CHIP | 1 |
| 194 | | CK73F1E1042 | CHIP | 1 |
| 195 | | CK73F1E1042 | CHIP | 1 |
| 196 | | CK73F1E1042 | CHIP | 1 |
| 197 | | CK73F1E1042 | CHIP | 1 |
| 198 | | CK73F1E1042 | CHIP | 1 |
| 199 | | CK73F1E1042 | CHIP | 1 |
| 200 | | CK73F1E1042 | CHIP | 1 |
| 201 | | CK73F1E1042 | CHIP | 1 |
| 202 | | CK73F1E1042 | CHIP | 1 |
| 203 | | CK73F1E1042 | CHIP | 1 |
| 204 | 95 | CK73F1E1042 | CHIP | 1 |
| 205 | | CK73F1E1042 | CHIP | 1 |
| 206 | | CK73F1E1042 | CHIP | 1 |
| 207 | | CK73F1E1042 | CHIP | 1 |
| 208 | | CK73F1E1042 | CHIP | 1 |
| 209 | | CK73F1E1042 | CHIP | 1 |
| 210 | | CK73F1E1042 | CHIP | 1 |
| 211 | 11 | CK73F1E1042 | CHIP | 1 |
| 212 | | CK73F1E1042 | CHIP | 1 |
| 213 | | CK73F1E1042 | CHIP | 1 |

Electronics Japan Co., Ltd. P.O. Box 100, Tokyo

U.F. Electronics Co., Ltd. P.O. Box 100, Tokyo

LEAF Electronics Co., Ltd. P.O. Box 100, Tokyo

Address: 100-0001, Tokyo

PARTS LIST

New Parts

Parts which Part No. are not supplied

Les pièces dont le numéro de partie n'est pas fourni

Teilenummern, die nicht geliefert werden

| Ref. No. | Address | Part No. | Description | Desti-
nation | Re-
marks |
|-----------|---------|-------------|-------------|------------------|--------------|
| 参照番号 | 位置 | 部品番号 | 部品名 / 規格 | 仕 | 備考 |
| C.14 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.15-16 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.17-120 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.21 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.22-124 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.25 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.26 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.27 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.28 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.29 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.30-37 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.38 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.39-40 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.41 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.42-43 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.44 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.45 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.46 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.47 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.48 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.49 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.50 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.51 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.52-153 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.54-155 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.56 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.57 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.58 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.59 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.60 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.61 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.62 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.63 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.64 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.65 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.66 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.67-74 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.75 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.76-77 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.78-81 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.82 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.83 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.84 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.85 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.86-191 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.92 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.93 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.94-198 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.199-201 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.202-204 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.205 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.206 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.207 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.208 | | CC73FSL1042 | CHIP C | 10.F | Z |
| C.209 | | CC73FSL1042 | CHIP C | 10.F | Z |

E. Schenck & Co. K.G. P. Comp. W. 22. 1972

2. PX. For (1st. 1972) T. England M. 2. 1972

2. AAFSE. 1972 E. Australia

2. 1972 safety critical components

PARTS LIST

Notes: Parts

Parts without Part No. are not stocked

Parts with Part No. are not stocked unless otherwise specified

Parts with Part No. are not stocked unless otherwise specified

| Ref. No. | Address | Part No. | Description | Dist. Re-
mation in ka
仕 向 備 考 |
|----------|---------|-------------|-------------|--------------------------------------|
| 参照番号 | 番 号 | 部 品 番 号 | 部 品 名 / 規 格 | |
| C211 | | C211F-51042 | C-211 F | |
| C212 | | C212E-2527 | C-212 E | |
| C213 | | C213E-3107 | C-213 E | |
| C214 | | C214E-4229 | C-214 E | |
| C215 | | C215E-51042 | C-215 E | |
| C216-216 | | C216E-1E832 | C-216 E | |
| C217 | | C217E-1E832 | C-217 E | |
| C218 | | C218E-1E832 | C-218 E | |
| C219 | | C219E-1E832 | C-219 E | |
| C21 | | C21E-1E832 | C-21 E | |
| C22 | | C22E-1E832 | C-22 E | |
| C23 | | C23E-1E832 | C-23 E | |
| C24 | | C24E-1E832 | C-24 E | |
| C25 | | C25E-1E832 | C-25 E | |
| C26 | | C26E-1E832 | C-26 E | |
| C27 | | C27E-1E832 | C-27 E | |
| C28 | | C28E-1E832 | C-28 E | |
| C29 | | C29E-1E832 | C-29 E | |
| C30 | | C30E-1E832 | C-30 E | |
| C31 | | C31E-1E832 | C-31 E | |
| C32 | | C32E-1E832 | C-32 E | |
| C33 | | C33E-1E832 | C-33 E | |
| C34 | | C34E-1E832 | C-34 E | |
| C35 | | C35E-1E832 | C-35 E | |
| C36 | | C36E-1E832 | C-36 E | |
| C37 | | C37E-1E832 | C-37 E | |
| C38 | | C38E-1E832 | C-38 E | |
| C39 | | C39E-1E832 | C-39 E | |
| C40 | | C40E-1E832 | C-40 E | |
| C41 | | C41E-1E832 | C-41 E | |
| C42 | | C42E-1E832 | C-42 E | |
| C43 | | C43E-1E832 | C-43 E | |
| C44 | | C44E-1E832 | C-44 E | |
| C45 | | C45E-1E832 | C-45 E | |
| C46 | | C46E-1E832 | C-46 E | |
| C47 | | C47E-1E832 | C-47 E | |
| C48 | | C48E-1E832 | C-48 E | |
| C49 | | C49E-1E832 | C-49 E | |
| C50 | | C50E-1E832 | C-50 E | |
| C51 | | C51E-1E832 | C-51 E | |
| C52 | | C52E-1E832 | C-52 E | |
| C53 | | C53E-1E832 | C-53 E | |
| C54 | | C54E-1E832 | C-54 E | |
| C55 | | C55E-1E832 | C-55 E | |
| C56 | | C56E-1E832 | C-56 E | |
| C57 | | C57E-1E832 | C-57 E | |
| C58 | | C58E-1E832 | C-58 E | |
| C59 | | C59E-1E832 | C-59 E | |
| C60 | | C60E-1E832 | C-60 E | |
| C61 | | C61E-1E832 | C-61 E | |
| C62 | | C62E-1E832 | C-62 E | |
| C63 | | C63E-1E832 | C-63 E | |
| C64 | | C64E-1E832 | C-64 E | |
| C65 | | C65E-1E832 | C-65 E | |
| C66 | | C66E-1E832 | C-66 E | |
| C67 | | C67E-1E832 | C-67 E | |
| C68 | | C68E-1E832 | C-68 E | |
| C69 | | C69E-1E832 | C-69 E | |
| C70 | | C70E-1E832 | C-70 E | |
| C71 | | C71E-1E832 | C-71 E | |
| C72 | | C72E-1E832 | C-72 E | |
| C73 | | C73E-1E832 | C-73 E | |
| C74 | | C74E-1E832 | C-74 E | |
| C75 | | C75E-1E832 | C-75 E | |
| C76 | | C76E-1E832 | C-76 E | |
| C77 | | C77E-1E832 | C-77 E | |
| C78 | | C78E-1E832 | C-78 E | |
| C79 | | C79E-1E832 | C-79 E | |
| C80 | | C80E-1E832 | C-80 E | |
| C81 | | C81E-1E832 | C-81 E | |
| C82 | | C82E-1E832 | C-82 E | |
| C83 | | C83E-1E832 | C-83 E | |
| C84 | | C84E-1E832 | C-84 E | |
| C85 | | C85E-1E832 | C-85 E | |
| C86 | | C86E-1E832 | C-86 E | |
| C87 | | C87E-1E832 | C-87 E | |
| C88 | | C88E-1E832 | C-88 E | |
| C89 | | C89E-1E832 | C-89 E | |
| C90 | | C90E-1E832 | C-90 E | |
| C91 | | C91E-1E832 | C-91 E | |
| C92 | | C92E-1E832 | C-92 E | |
| C93 | | C93E-1E832 | C-93 E | |
| C94 | | C94E-1E832 | C-94 E | |
| C95 | | C95E-1E832 | C-95 E | |
| C96 | | C96E-1E832 | C-96 E | |
| C97 | | C97E-1E832 | C-97 E | |
| C98 | | C98E-1E832 | C-98 E | |
| C99 | | C99E-1E832 | C-99 E | |
| C100 | | C100E-1E832 | C-100 E | |

E: Standard, K: 1/2, P: 1/4, W: 1/8

U: 1/2, L: 1/4, F: 1/8, M: 1/16, S: 1/32

L: 1/2, F: 1/4, M: 1/8, S: 1/16

A: 1/2, F: 1/4, M: 1/8, S: 1/16

PARTS LIST

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

are without Parts No. 11100 : 63-64

২০ জনের বেশি পড়াশোনা করেছেন এবং ১০ জনের কম পড়াশোনা করেছেন।

[illegible]

| Ref No. | Address | Part No. | Description | Desti- Re-
nation marks |
|---------|---------|--------------|----------------------------|----------------------------|
| 参照番号 | 番 号 | 部 品 番 号 | 部 品 名 / 規 格 | 仕 向 番号 |
| L24 | 1.5 | L14-2 24 0. | VALV 6 | |
| L25 | | L10-0143 25 | | |
| L27 | | L40-2215-25 | SHAL 3 (E) 13300163-1210-1 | |
| L28 | | L10-0513-01 | | |
| PI | -252 | 4E13782A1371 | CHIP 8 | |
| PI03 | | -E135B2B1821 | CHIP R 6.51 3 1/2W | |
| VR1 | | 4 2-3126 05 | TPINVA 167.104 | |
| VR2 | | 4 2-3126 0 | TPINVA 167.474 | |
| VR3 | | 4 2-3126-15 | TPINVA 167.224 | |
| VR4 | | 4 2-3126 05 | TPINVA 167.104 | |
| VR5 | | R12-67.8-25 | TPINVA 167.474 | |
| VR6 | -8 | 4 2-3132-25 | TPINVA 167.474 | |
| VR7 | | R12-0104-25 | TPINVA 167.224 | |
| VR10 | | R12 3131-25 | TPINVA 167.234 | |
| VR1. | | 4 2-3126-05 | TPINVA 167.224 | |
| VR2 | | R12 0571-15 | CHIP 4 0.5W | |
| VR3 | | R12 0579 01 | CHIP 3 0.6W | |
| VR4 | | R12-1061-25 | CHIP 4 TEST 0.5W | |
| VR5 | | R12-1069 01 | CHIP R 0.5W | |
| D1 | -14 | RLS135 | CHIP DISC | |
| D15 | | 154.494 | DISC | |
| D16 | .5 | 1860 | DISC | |
| D20 | | RLS73 4 | CHIP ZENER DISC(5.1V) | |
| D21 | 22 | RLS73 | CHIP 2.60V | |
| D23 | | HSM6845 | CHIP DISC | |
| D24 | | LA222-K1 | CHIP DISC | |
| D25 | | RLZ13.65 | CHIP ZENER DISC(3.6V) | |
| D26 | -50 | RLS73 | CHIP DISC | |
| D3 | | HSM6845 | CHIP DISC | |
| D32 | -35 | RLS73 | CHIP DISC | |
| D36 | 37 | DAN202 K1 | CHIP DISC | |
| D38 | 39 | RLS73 | CHIP DISC | |
| D40 | | DAN202 K1 | CHIP DISC | |
| D41 | | NE4873-33 | CHIP | |
| D42 | | HSM6843 | CHIP DISC | |
| D43 | 44 | RLS33 | CHIP DISC | |
| D44 | -48 | RLS 35 | CHIP DISC | |
| D49 | -51 | RLS | CHIP DISC | |
| D51 | | RLS73 | CHIP DISC | |
| D53 | | DAN202 K1 | CHIP DISC | |
| D54 | 55 | RLS73 | CHIP DISC | |
| D56 | | DAN202 K1 | CHIP DISC | |
| D57 | | RLZ1123 | CHIP DISC(12V) | |
| D59 | | LA202-K1 | CHIP DISC | |
| D60 | 64 | RLS135 | CHIP DISC | |
| D65 | | RLS73 | CHIP DISC | |
| D66 | 67 | HSM6845 | CHIP DISC | |
| D68 | -70 | RLS73 | CHIP DISC | |
| D71 | | RLZ19.1C | CHIP ZENER DISC(9.1V) | |
| D72 | 73 | RLS73 | CHIP DISC | |
| D74 | | SS133 | DISC | |
| D75 | | TC4064B | IC(4064)-PAL S67C- 40 | |
| D76 | | N712933V | IC(6742)PAPA 7129 121 | |
| D77 | | U-01.58 2 | IC(4064)AMP | |

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UE 22-E 47000 22-740

* returns table of all components

PARTS LIST

References

Parts without Part No. are not supplied.

Les articles non mentionnés dans le Partis No. ne sont pas fournis.

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| Ref No | Address | Part No. | Description | Destination | Remarks |
|-------------------|---------|-----------------------------|-----------------------------|-------------|---------|
| 参照番号 | 位置 | 部品番号 | 部品名 / 仕様 | 仕向 | 備考 |
| | | 842-2437-04 | Label | | |
| Q2 | | 13X52875-0524
250-214-02 | CHIP FET
C-12 FRAME 576P | | |
| Q2 | | 134-0490-05
134-2153-05 | CHES (3) 12 20 1
C9.. | | |
| D. | | 154.64 | 7A71 CAP 5102E | | |
| VCO (X58-3830-X0) | | | | | |
| C1 | | C473F3.1-02X | CHIP C | 10.00F | A2 |
| C2 | -6 | CK73-B1E103K | CHIP C | 0.010UF | PL |
| C3 | .8 | CC73FCH1HXXK | CHIP C | | |
| C4 | .8 | CK73-B1H103K | CHIP C | 100PF | AF |
| C5 | .8 | CK73F3.3-03X | CHIP C | 0.001UF | PL |
| C9 | .3 | CC73F3.1-02X | CHIP C | | |
| C14 | .15 | C473F3.1-02X | CHIP C | 10.00F | A2 |
| C14 | .15 | CK73F3.3-03X | CHIP C | 0.001UF | PL |
| C16 | -20 | CC73FCH1HXXK | C-2 C | | |
| C17 | .22 | C473F3.1-02X | CHIP C | 10.00F | A2 |
| C21 | .22 | CK73B91E103K | C-12 C | 12 20 1 | PL |
| C23 | -27 | CC73FCH1HXXK | CHIP C | | |
| C28 | | CK73-B1H103K | C-2 C | 1000PF | A2 |
| C28 | | C473F3.3-03X | CHIP C | 0.001UF | PL |
| C29 | .32 | C91-C 19-05 | C94WIC | 12470F | |
| C31 | .2 | C05-0349-05 | TRIMMING CAP 100F | | |
| C33 | .4 | C05-0340-05 | TRIMMING CAP 6PF | A2 | |
| C33 | .4 | C05-0439-05 | TRIMMING CAP 10PF | PL | |
| A | | 340-5138-05 | PIN CONNECTOR 4P | | |
| A2 | | 340-5159-05 | PIN CONNECTOR 2- | | |
| A1 | | 3.1-1.40-04 | SHIELDING COVER | | |
| A2 | | 3.1-1.41-04 | SHIELDING COVER | | |
| L1 | | 33-0654-05 | C-ME COIL 2.7UH | | |
| L2 | | 34-2354-05 | COIL (VCO) | AF | |
| L2 | | 34-2355-05 | COIL (VCO) | PL | |
| L3 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L4 | | 33-0654-05 | C-ME COIL 2.7UH | | |
| L5 | | 34-2354-05 | COIL (VCO) | AF | |
| L5 | | 34-2355-05 | COIL (VCO) | PL | |
| L6 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L7 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L8 | | 34-2354-05 | COIL (VCO) | A2 | |
| L8 | | 34-2356-05 | COIL (VCO) | PL | |
| L9 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L10 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L11 | | 34-2354-05 | COIL (VCO) | A2 | |
| L11 | | 34-2357-05 | COIL (VCO) | PL | |
| L12 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L13 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L14 | | 34-2354-05 | COIL (VCO) | A2 | |
| L14 | | 34 | | | |
| L15 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L16 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L17 | | 34-2354-05 | COIL (VCO) | A2 | |
| L17 | | 34 | | | |
| L18 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L19 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L20 | | 34-2354-05 | COIL (VCO) | A2 | |
| L20 | | 34 | | | |
| L21 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L22 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L23 | | 34-2354-05 | COIL (VCO) | A2 | |
| L23 | | 34 | | | |
| L24 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L25 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L26 | | 34-2354-05 | COIL (VCO) | A2 | |
| L26 | | 34 | | | |
| L27 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L28 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L29 | | 34-2354-05 | COIL (VCO) | A2 | |
| L29 | | 34 | | | |
| L30 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L31 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L32 | | 34-2354-05 | COIL (VCO) | A2 | |
| L32 | | 34 | | | |
| L33 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L34 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L35 | | 34-2354-05 | COIL (VCO) | A2 | |
| L35 | | 34 | | | |
| L36 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L37 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L38 | | 34-2354-05 | COIL (VCO) | A2 | |
| L38 | | 34 | | | |
| L39 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L40 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L41 | | 34-2354-05 | COIL (VCO) | A2 | |
| L41 | | 34 | | | |
| L42 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L43 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L44 | | 34-2354-05 | COIL (VCO) | A2 | |
| L44 | | 34 | | | |
| L45 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L46 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L47 | | 34-2354-05 | COIL (VCO) | A2 | |
| L47 | | 34 | | | |
| L48 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L49 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L50 | | 34-2354-05 | COIL (VCO) | A2 | |
| L50 | | 34 | | | |
| L51 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L52 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L53 | | 34-2354-05 | COIL (VCO) | A2 | |
| L53 | | 34 | | | |
| L54 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L55 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L56 | | 34-2354-05 | COIL (VCO) | A2 | |
| L56 | | 34 | | | |
| L57 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L58 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L59 | | 34-2354-05 | COIL (VCO) | A2 | |
| L59 | | 34 | | | |
| L60 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L61 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L62 | | 34-2354-05 | COIL (VCO) | A2 | |
| L62 | | 34 | | | |
| L63 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L64 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L65 | | 34-2354-05 | COIL (VCO) | A2 | |
| L65 | | 34 | | | |
| L66 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L67 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L68 | | 34-2354-05 | COIL (VCO) | A2 | |
| L68 | | 34 | | | |
| L69 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L70 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L71 | | 34-2354-05 | COIL (VCO) | A2 | |
| L71 | | 34 | | | |
| L72 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L73 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L74 | | 34-2354-05 | COIL (VCO) | A2 | |
| L74 | | 34 | | | |
| L75 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L76 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L77 | | 34-2354-05 | COIL (VCO) | A2 | |
| L77 | | 34 | | | |
| L78 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L79 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L80 | | 34-2354-05 | COIL (VCO) | A2 | |
| L80 | | 34 | | | |
| L81 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L82 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L83 | | 34-2354-05 | COIL (VCO) | A2 | |
| L83 | | 34 | | | |
| L84 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L85 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L86 | | 34-2354-05 | COIL (VCO) | A2 | |
| L86 | | 34 | | | |
| L87 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L88 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L89 | | 34-2354-05 | COIL (VCO) | A2 | |
| L89 | | 34 | | | |
| L90 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L91 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L92 | | 34-2354-05 | COIL (VCO) | A2 | |
| L92 | | 34 | | | |
| L93 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L94 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L95 | | 34-2354-05 | COIL (VCO) | A2 | |
| L95 | | 34 | | | |
| L96 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L97 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L98 | | 34-2354-05 | COIL (VCO) | A2 | |
| L98 | | 34 | | | |
| L99 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L100 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L101 | | 34-2354-05 | COIL (VCO) | A2 | |
| L101 | | 34 | | | |
| L102 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L103 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L104 | | 34-2354-05 | COIL (VCO) | A2 | |
| L104 | | 34 | | | |
| L105 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L106 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L107 | | 34-2354-05 | COIL (VCO) | A2 | |
| L107 | | 34 | | | |
| L108 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L109 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L110 | | 34-2354-05 | COIL (VCO) | A2 | |
| L110 | | 34 | | | |
| L111 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L112 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L113 | | 34-2354-05 | COIL (VCO) | A2 | |
| L113 | | 34 | | | |
| L114 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L115 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L116 | | 34-2354-05 | COIL (VCO) | A2 | |
| L116 | | 34 | | | |
| L117 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L118 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L119 | | 34-2354-05 | COIL (VCO) | A2 | |
| L119 | | 34 | | | |
| L120 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L121 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L122 | | 34-2354-05 | COIL (VCO) | A2 | |
| L122 | | 34 | | | |
| L123 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L124 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L125 | | 34-2354-05 | COIL (VCO) | A2 | |
| L125 | | 34 | | | |
| L126 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L127 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L128 | | 34-2354-05 | COIL (VCO) | A2 | |
| L128 | | 34 | | | |
| L129 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L130 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L131 | | 34-2354-05 | COIL (VCO) | A2 | |
| L131 | | 34 | | | |
| L132 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L133 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L134 | | 34-2354-05 | COIL (VCO) | A2 | |
| L134 | | 34 | | | |
| L135 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L136 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L137 | | 34-2354-05 | COIL (VCO) | A2 | |
| L137 | | 34 | | | |
| L138 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L139 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L140 | | 34-2354-05 | COIL (VCO) | A2 | |
| L140 | | 34 | | | |
| L141 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L142 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L143 | | 34-2354-05 | COIL (VCO) | A2 | |
| L143 | | 34 | | | |
| L144 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L145 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L146 | | 34-2354-05 | COIL (VCO) | A2 | |
| L146 | | 34 | | | |
| L147 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L148 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L149 | | 34-2354-05 | COIL (VCO) | A2 | |
| L149 | | 34 | | | |
| L150 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L151 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L152 | | 34-2354-05 | COIL (VCO) | A2 | |
| L152 | | 34 | | | |
| L153 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L154 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L155 | | 34-2354-05 | COIL (VCO) | A2 | |
| L155 | | 34 | | | |
| L156 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L157 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L158 | | 34-2354-05 | COIL (VCO) | A2 | |
| L158 | | 34 | | | |
| L159 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L160 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L161 | | 34-2354-05 | COIL (VCO) | A2 | |
| L161 | | 34 | | | |
| L162 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L163 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L164 | | 34-2354-05 | COIL (VCO) | A2 | |
| L164 | | 34 | | | |
| L165 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L166 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L167 | | 34-2354-05 | COIL (VCO) | A2 | |
| L167 | | 34 | | | |
| L168 | | 40-4791-19 | SMALL FIXED INDUCTOR 4.7UH | | |
| L169 | | 33-0654-05 | CHUNK COIL 2.7UH | | |
| L170 | | 34-2354-05 | COIL (VCO | | |

E. Scandone, L. Lopez, R. Ueda, P. Zappalà, W. Liang

U F3:F4 : 2001-2002 T 2002/06 M Other Assets

LE 445516, 1911 2. 4. 1911

 always safety 1st! always.

PARTS LIST

Notes:

Parts without Part No. are not supplied.

Les articles sans numéro de pièce ne sont pas fournis.

Alle ohne Parts No. werden nicht geliefert.

| Ref. No. | Address | Part No. | Description | Designation |
|---------------------------------|---------|--------------|----------------------|-------------|
| 参考番号 | 住所 | 部品番号 | 部品名/記号 | 仕組番号 |
| C2 | | RLS135 | C-12 C 50- | |
| C3 | | 15v 64 | CHIP DISC | |
| C4 | | RLS135 | C-12 C 60 | |
| C5 | | RLS135 | CHIP DISC | |
| C6 | | RLS135 | C-12 C 60 | |
| C7 | | SV165 | C-12 C 60 | |
| C8 | | RLS135 | CHIP DISC | |
| L1 | 4 | 254210-03 | C-12 C 60 | |
| VOX (XS9-1880-01) | | | | |
| C2 | | C473F3-22.5F | C-12 C 1.1220F K | |
| C3 | | CK73F3-1.02K | CHIP C 1000 F K | |
| E23 | 047-05 | | TERMINAL | |
| R2 | -3 | PK73F32AXXJ | C-12 C | |
| R3 | -3 | R92-1670-05 | CHIP R 0 E-N | |
| D1 | 12 | EA7202-B | CHIP DISC | |
| IC1 | | NJH1914V | IC 3P AMP K | |
| IC2 | | TC4001B | IC 4MP X4 | |
| G1 | | 25C2712(V) | C-12 TRANSISTOR | |
| FM MIC AMP (XS9-3000-03) | | | | |
| C1 | -3 | CK73F3-1.02K | C-12 C | |
| C4 | | CK73F3-1.02K | C-12 C 1000F K | |
| C5 | | CK73F3-1.02K | CHIP C 0.022F K | |
| C2 | | CK73F3-1.02K | C-12 C 560PF K | |
| E23 | 047-05 | | TERMINAL | |
| R1 | -2 | PK73F32AXXJ | C-12 C | |
| R3 | | R92-0670-05 | CHIP R 0 E-N | |
| IC1 | | VJ4558R | IC 4P AMP K2 | |
| G1 | | 25C2712(V) | CHIP TRANSISTOR | |
| NB2 (XS9-3350-00) | | | | |
| C3 | | CK73F3-1.02K | C-12 C 0.47F Z | |
| C2 | -1 | CK73F3-1.02K | CHIP C | |
| E23 | 047-05 | | TERMINAL | |
| R1 | -3 | PK73F32AXXJ | C-12 C | |
| R3 | -3 | R92-0670-05 | CHIP R 0 E-N | |
| G1 | | DT01 4E1 | IC 1P TRANSISTOR | |
| IC1 | | TC4001B | IC 4MP X4 | |
| VCO1 (XS9-3440-00) | | | | |
| C1 | | CK73F3-1.02K | CHIP C 0.01F C | |
| C2 | | CK73F3-1.02K | CHIP C 1000PF K | |
| C3 | | CK73F3-1.02K | CHIP C 3.0PF C | |
| C4 | | CK73F3-1.02K | CHIP C 0.010F C | |
| E23 | 047-05 | | TERMINAL | |
| L1 | | L40 0.01 K8 | SMALL FIXED INDUCTOR | |
| R1 | 7 | PK73F32AXXJ | CHIP R | |
| G1 | | 25X210-03 | CHIP FET | |
| G2 | | 25C2712(V) | CHIP TRANSISTOR | |

Excludes & Excp: KUSA P Japan W&S

U.F. (F) (S) (M) (A) (J) (K) (L) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

IE AAF-SE, JCC, K. Australia

△ indicates safety critical components

PARTS LIST

A New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teil ohne Parts No. werden nicht geliefert.

| Ref. No. | Address | Parts No. | Description | Destination |
|----------|---------|------------------|-------------|-------------|
| 参照番号 | アドレス | 部品番号 | 部品名/規格 | 仕向番号 |
| C20 -72 | | CK3-BIE123K | CHIP C | 0.022.F |
| C23 | | CE04EM1E22CM | EXEC73 | 22.2 |
| C24 | | C90-2045-03 | SPICTP9 | 2.2.F |
| C25 | | CE04EM1E22CM | EXEC73 | 22.2 |
| C26 | | C90-2045-03 | SPICTP9 | 2.2.F |
| C27 -2E | | CE04EM1E101M | EXEC73 | 10.0.F |
| C29 -32 | | CK33-BIH124K | CHIP C | |
| C31 -32 | | C90-2045-03 | EXEC73 | 2.2.F |
| C33 -36 | | CK33-BIE223K | CHIP C | 0.022.F |
| C40 -41 | | CC73-S...-101J | C-12 C | 100PF |
| C42 -45 | | CK33EB1E663K | CHIP C | 0.058.F |
| C46 -50 | | CC73-CH...-202J | C-12 C | 200PF |
| C51 -52 | | CC73FSL1H221J | CHIP C | 220PF |
| C53 | | CC73FCH...-02J | C-12 C | 100PF |
| C54 | | C92-2014-05 | CHIP-TAM | F |
| C55 | | CE04EM1H3R3M | EXEC73 | 3.3UF |
| C56 | | C90-2040-05 | EXEC73 | 2.2.F |
| C57 | | CE04EM1H3R3M | EXEC73 | 3.3UF |
| C58 | | C92-2014-05 | CHIP-TAM | F |
| C59 -63 | | CC73FSL1HXXXJ | C-12 C | |
| C64 | | CK73-BIH153K | CHIP C | 0.015.F |
| C65 -66 | | CK73FB1E223K | C-12 C | 2.22UF |
| C67 | | CC73FSL...-01J | CHIP C | 100PF |
| C68 -73 | | CK73FB1E223K | CHIP C | 2.22UF |
| C74 -75 | | CC73FSL...-XXXJ | C-12 C | |
| C76 | | CC73FCH1H102J | CHIP C | 100PF |
| C77 | | CK73-BIE223K | C-12 C | 2.22UF |
| C78 | | C92-2014-05 | CHIP-TAM | F |
| C90 -91 | | CK73-BIH104K | C-12 C | 100PF |
| C92 | | CC73FB1E223K | CHIP C | 2.022UF |
| C93 -96 | | CC73FSL...-01J | C-12 C | 100PF |
| C200 | | CE04EM1E22CM | EXEC73 | 22.2 |
| C201 | | CK73-BIE223K | C-12 C | 2.22UF |
| C202-208 | | CC73FSL1H101J | CHIP C | 100PF |
| C209 | | CK73-FIE104Z | C-12 C | 2.1UF |
| C210 | | CC73EB1E353K | CHIP C | 0.058.F |
| C211 | | CK73FB1H102K | C-12 C | 100PF |
| C212-213 | | CC73FSL1H101J | CHIP C | 100PF |
| C214-222 | | CC73FB1E223K | CHIP C | 220PF |
| C224 | | CK73FB1E104Z | CHIP C | 0.1UF |
| C225-229 | | CC73FB1E223K | CHIP C | 0.022.F |
| C230 | | CE04EM1C47CM | EXEC73 | 47UF |
| C231-233 | | CC73FB1E223K | CHIP C | 0.022.F |
| C232-234 | | CC73FSL...-01J | C-12 C | 100PF |
| C235-236 | | CC73FB1E...-24 | CHIP C | 100PF |
| C237 | | CK73-BIE223K | C-12 C | 2.22UF |
| C238 | | CC73FSL...-04Z | CHIP C | 0.1UF |
| C239 | | CE04EM1E101M | EXEC73 | 10.0UF |
| C240 | | CC73EB1E353K | CHIP C | 0.058 |
| C241 | | CK73-BIH153K | C-12 C | 2.015UF |
| C242 | | CE04EM1C47CM | CHIP C | 47UF |
| C243 | | CK73-BIE362K | C-12 C | 2.058UF |
| C244 | | CC73FB1E...-5624 | CHIP C | 560PF |
| C245 | | CE04EM1C47CM | EXEC73 | 47.F |
| C246 | | CC73FB1E...-024 | CHIP C | 100PF |

E: Scandinavia & Europe K: USA P: Canada W: F: Japan

U: FR: France (main) T: United V: Other Areas

UE: AAFEE(Europe) X: A: Japan

⚠ indicates safety critical components

PARTS LIST

* New Parts

Parts Abbrev. Parts No. 72 and 73 only

as an abbreviation for the former parts of Parts No. 72 and 73 only

To be sure Parts No. 72 and 73 only

| Ref. No. | Address | Part No. | Description | Distri-
bution | Re-
marks |
|----------|---------|---------------|----------------------------|-------------------|--------------|
| 参照番号 | 番地 | 部品番号 | 部品名/規格 | 仕向 | 備考 |
| C247 247 | | C2775C-1-XXXX | C-17 C | | |
| C250 | | C2775SLIM-100 | C-17 C | 47PF | J |
| C25 | | C2775C-100C | C-17 C | 3.0PF | C |
| C252-254 | | C2775C-1-XXXX | C-17 C | | |
| C255 | | C2775C-1-XXXX | C-17 C | 100PF | 25MV |
| C256 | | C2775C-1-XXXX | C-17 C | 100PF | K |
| C257 | | C2775C-1-XXXX | C-17 C | 47PF | 10MV |
| C258 263 | | C2775C-1-XXXX | C-17 C | | |
| C264 265 | | C2775SLIM-100 | C-17 C | 10PF | C |
| C266 | | C2775SLIM-100 | C-17 C | 22PF | K |
| C267-271 | | C2775SLIM-100 | C-17 C | 10PF | C |
| CN1 | | E31-5046-05 | CONNECTING WIRE | | |
| CN2 | | E31-5046-05 | CONNECTING WIRE | | |
| CN3 | | E41-3243-04 | PIN CONNECTOR(4P) | | |
| CN4 5 | | E41-3243-04 | PIN CONNECTOR(4P) | | |
| CN6 | | E40-5046-05 | PIN CONNECTOR(4P) | | |
| CN7 | | E40-5046-05 | PIN CONNECTOR(4P) | | |
| CN8 | | E40-5046-05 | PIN CONNECTOR(4P) | | |
| TP1 -3 | | E23-0464-05 | TERMINAL | | |
| TP5 | | E40-5046-05 | PIN CONNECTOR | | |
| TP6 | | E23-0464-05 | TERMINAL | | |
| 301 | 33 | F01-0972-02 | HEAT SINK | | |
| 302 | 33 | F10-1409-03 | SHIELDING PLATE | | |
| 303 | 30 | G02-2574-04 | FLAT SPRING | | |
| 304 | 30 | J21-4260-04 | MOUNTING HARDWARE | | |
| CP1 | | L22-0335-05 | CERAMIC FILTER | | |
| L1 2 | | L40-1011-29 | SMALL FIXED INDUCTOR(10MH) | | |
| L2 | | L40-1011-29 | SMALL FIXED INDUCTOR(10MH) | | |
| L10 | | L40-1011-29 | SMALL FIXED INDUCTOR(10MH) | | |
| L11 | | L40-1011-29 | SMALL FIXED INDUCTOR(10MH) | | |
| L12 | | L32-2130-05 | OSCILLATING COIL(10MH) | | |
| L13 | | L40-1011-29 | SMALL FIXED INDUCTOR(10MH) | | |
| X1 | | L77-1400-05 | CRYSTAL RESONATOR(25MHZ) | | |
| Y | 33 | M30-2606-46 | FAST HEAD MAGNETIC SCREW | | |
| J | 33 | M67-2606-46 | HAZIER HEAD TAPSCREW | | |
| Q1 -216 | | P4775F824XX | C-17 C | | |
| Q91 | | P12-3121-05 | TRIMMING POT | | |
| S1 12 | | S59-0439-05 | DIP SWITCH | | |
| S3 | | S59-4401-05 | DIP SWITCH | | |
| IC15 | | UPC7901S-F | IC | | |
| IC16 | | UPC7901S-F | IC | | |
| IC17 | | PE6-0125F-350 | IC | | |
| E1 | | P33.9V-32 | C-17 C | 47PF | 3.9V |
| Q2 | | 155276 | C-17 C | 2760E | |

E Scandinavia & Europe E USA P Canada W Japan

L France M Germany T Ireland V Other Areas

AE Africa/South America X Australia

Δ indicates safety or other components

PARTS LIST

* New Parts

Parts without Parts No. are not supplied

As an indication of the number of parts, the number of parts is shown in parentheses

The same Parts No. is shown in parentheses

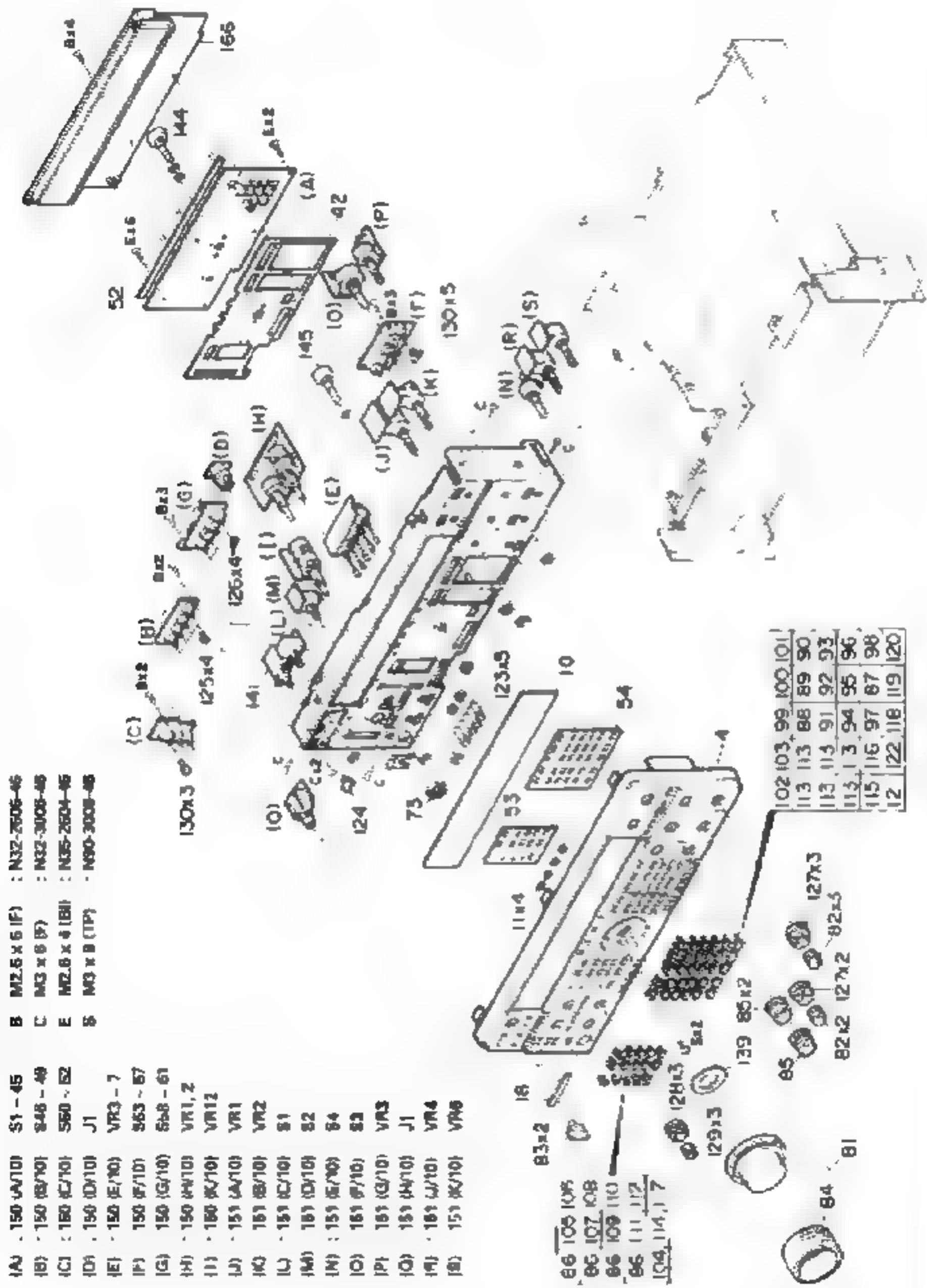
| Ref. No. | Address | Parts No. | Description | Destination | Remarks |
|----------|---------|--------------|----------------------------|-------------|---------|
| 参照番号 | 位置 | 部品番号 | 部品名/機能 | 仕向 | 備考 |
| C3 | | 25272 | DICKE | | |
| 4 | | 15V 16 | 2-623 | | |
| IC1 | 2 | HC74HC4251F | IC | | |
| IC2 | | HC74HC4251F | IC | | |
| IC4 | 5 | NJM4558* | 11-5P AMP X1 | | |
| IC6 | | VJ4562* | 10-5P AMP X1 | | |
| IC7 | -3 | NJM4558* | 11-5P AMP X1 | | |
| IC10 | 1 | VJ4562* | IC | | |
| IC12 | | PMT84P | IC | | |
| IC13 | | HC74HC150* | IC | | |
| IC14 | | HC74HC74* | IC | | |
| IC17 | | 20V5AP | IC-04 CONVERTER | | |
| IC18 | | HC74HC4251F | IC | | |
| IC19 | | HM361* | IC | | |
| IC20 | | NJM4558* | 11-5P AMP X2 | | |
| IC21 | | HC74HC4251F | IC | | |
| IC31 | | VS120E15J10C | IC | | |
| IC33 | | S-8054A R-1A | IC(VOLTAGE DETECTOR) | | |
| IC34 | | CM-29253 | IC(CITAL SELECT P.L.) | | |
| IC35 | | VJ78L05UA | IC(VOLTAGE REGULATOR+5.0V) | | |
| IC36 | | HC74HC150* | IC | | |
| Q1 | | 2SK508(151) | CHIP FET | | |
| Q2 | 4 | 2SC2412Y(8) | C-17 TRANSISTOR | | |
| Q11 | | JTC144M | 2 CITAL TRANSISTOR | | |
| Q12 | | 2SC2714(Y) | C-17 TRANSISTOR | | |
| Q13 | | 2SK210(OR) | CHIP FET | | |
| Q14 | -16 | 2SC2714 | C-17 TRANSISTOR | | |
| Q17 | -19 | 2SC3324-G | CHIP TRANSISTOR | | |

B: Standard & Europe K: USA P: Canada W: Japan

U: For East & South America M: Other Areas

UL: UL-recognized X: Others

⚠ Always safety check components



TS-950S (2/6)

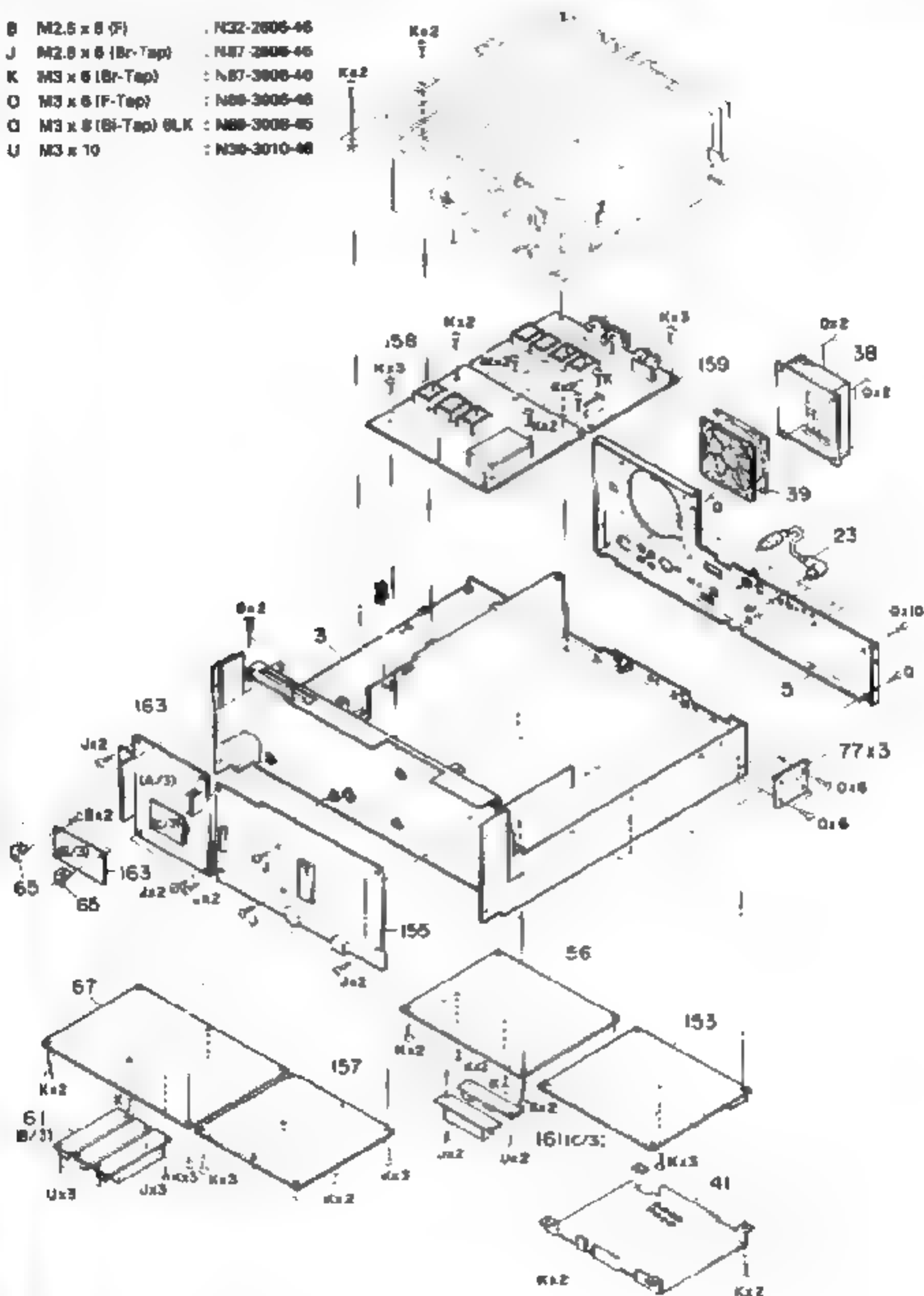
- B M2.5 x 6 (F) : N32-2506-46
- C M3 x 6 (F) : N32-3006-46
- E M2.5 x 4 (B) : N35-2504-46
- S M3 x 8 (TP) : N90-3008-46

- 1A : 150 (A/10) S1-45
- 1B : 150 (B/10) S48-48
- 1C : 150 (C/10) S50-52
- 1D : 150 (D/10) J1
- 1E : 150 (E/10) VR3-7
- 1F : 150 (F/10) S63-67
- 1G : 150 (G/10) S68-61
- 1H : 150 (H/10) VR1,2
- 1I : 150 (I/10) VR12
- 1J : 151 (A/10) VR1
- 1K : 151 (B/10) VR2
- 1L : 151 (C/10) S1
- 1M : 151 (D/10) S2
- 1N : 151 (E/10) S4
- 1O : 151 (F/10) S3
- 1P : 151 (G/10) VR3
- 1Q : 151 (H/10) J1
- 1R : 151 (I/10) VR4
- 1S : 151 (K/10) VR6

| | | | | |
|-----|-----|-----|-----|-----|
| 102 | 103 | 99 | 100 | 101 |
| 113 | 113 | 88 | 89 | 90 |
| 113 | 113 | 91 | 92 | 93 |
| 113 | 113 | 94 | 95 | 96 |
| 115 | 115 | 97 | 87 | 98 |
| 12 | 122 | 118 | 119 | 120 |

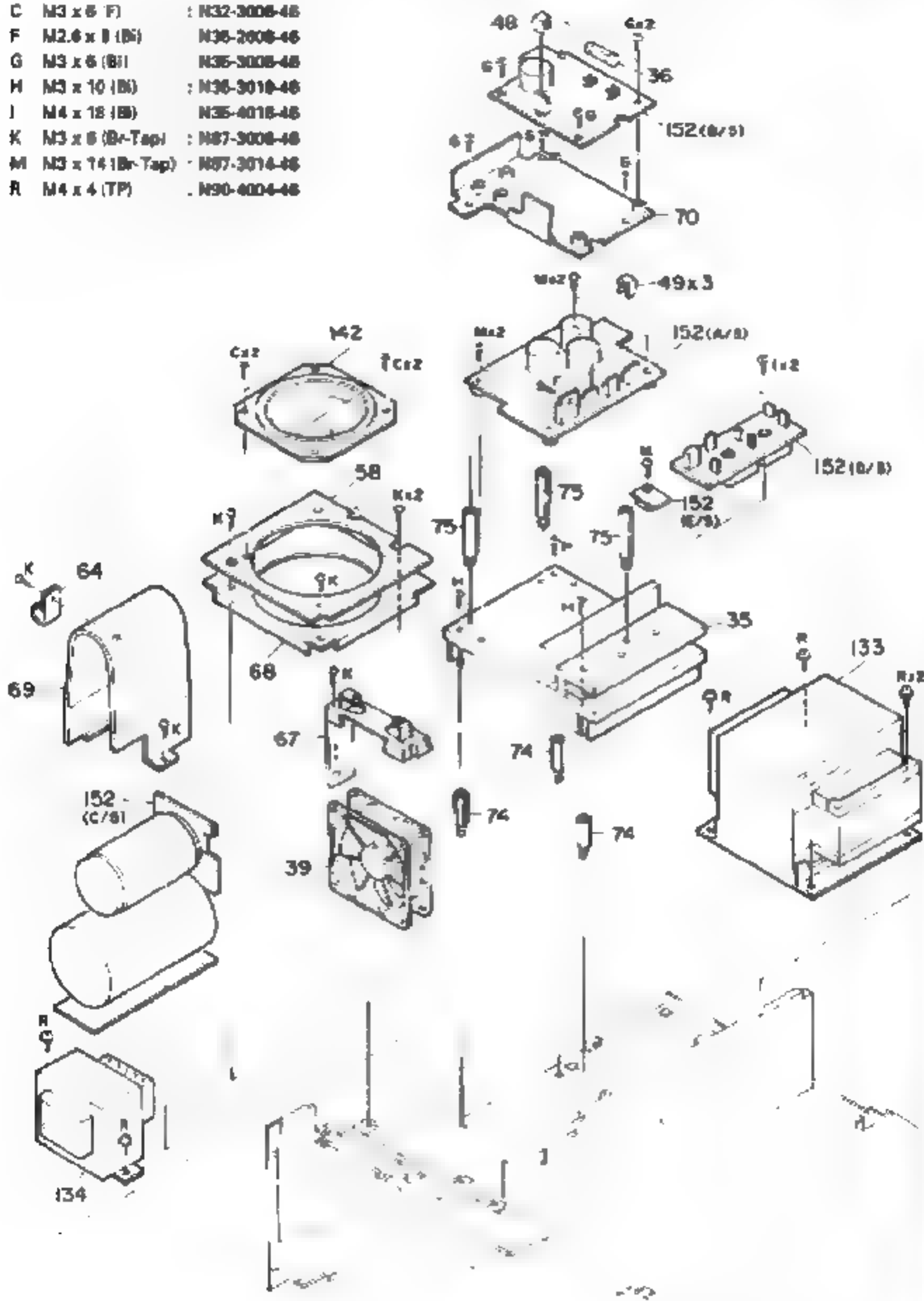
DISASSEMBLY

- | | | |
|---|---------------------|---------------|
| B | M2.5 x 6 (F) | : N32-2806-46 |
| J | M2.5 x 6 (Br-Tap) | : N37-2806-46 |
| K | M3 x 6 (Br-Tap) | : N37-3006-40 |
| O | M3 x 6 (F-Tap) | : N38-3006-46 |
| Q | M3 x 8 (Br-Tap) BLK | : N38-3008-45 |
| U | M3 x 10 | : N39-3010-46 |



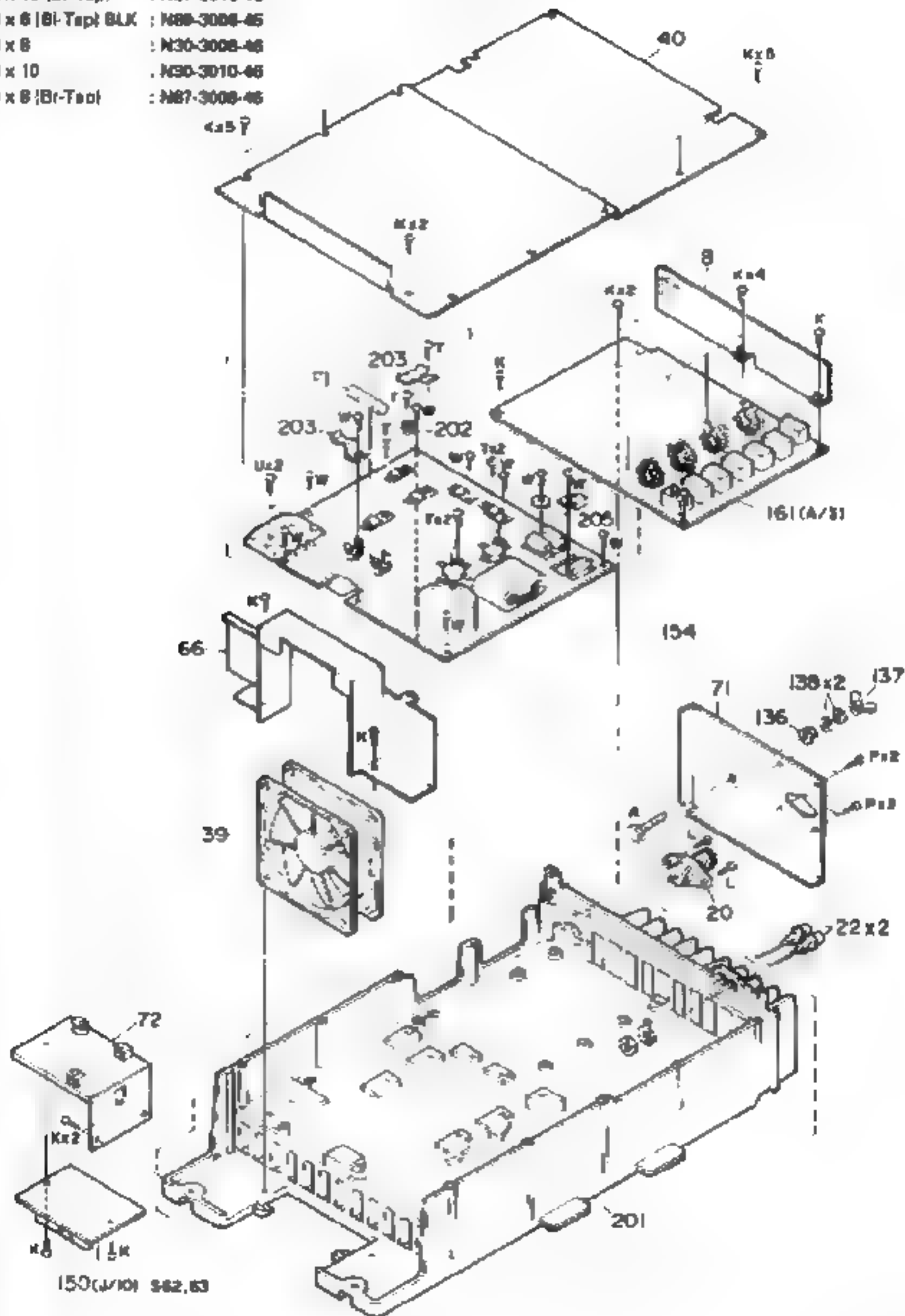
DISASSEMBLY

| | | |
|---|-----------------|---------------|
| C | M3 x 6 (F) | : N32-3008-48 |
| F | M2.6 x 8 (B) | : N35-3008-48 |
| G | M3 x 6 (B) | : N35-3008-48 |
| H | M3 x 10 (B) | : N35-3018-48 |
| I | M4 x 18 (B) | : N35-4018-48 |
| K | M3 x 6 (B-Tap) | : N87-3008-48 |
| M | M3 x 14 (B-Tap) | : N87-3014-48 |
| R | M4 x 4 (TP) | : N90-4004-48 |

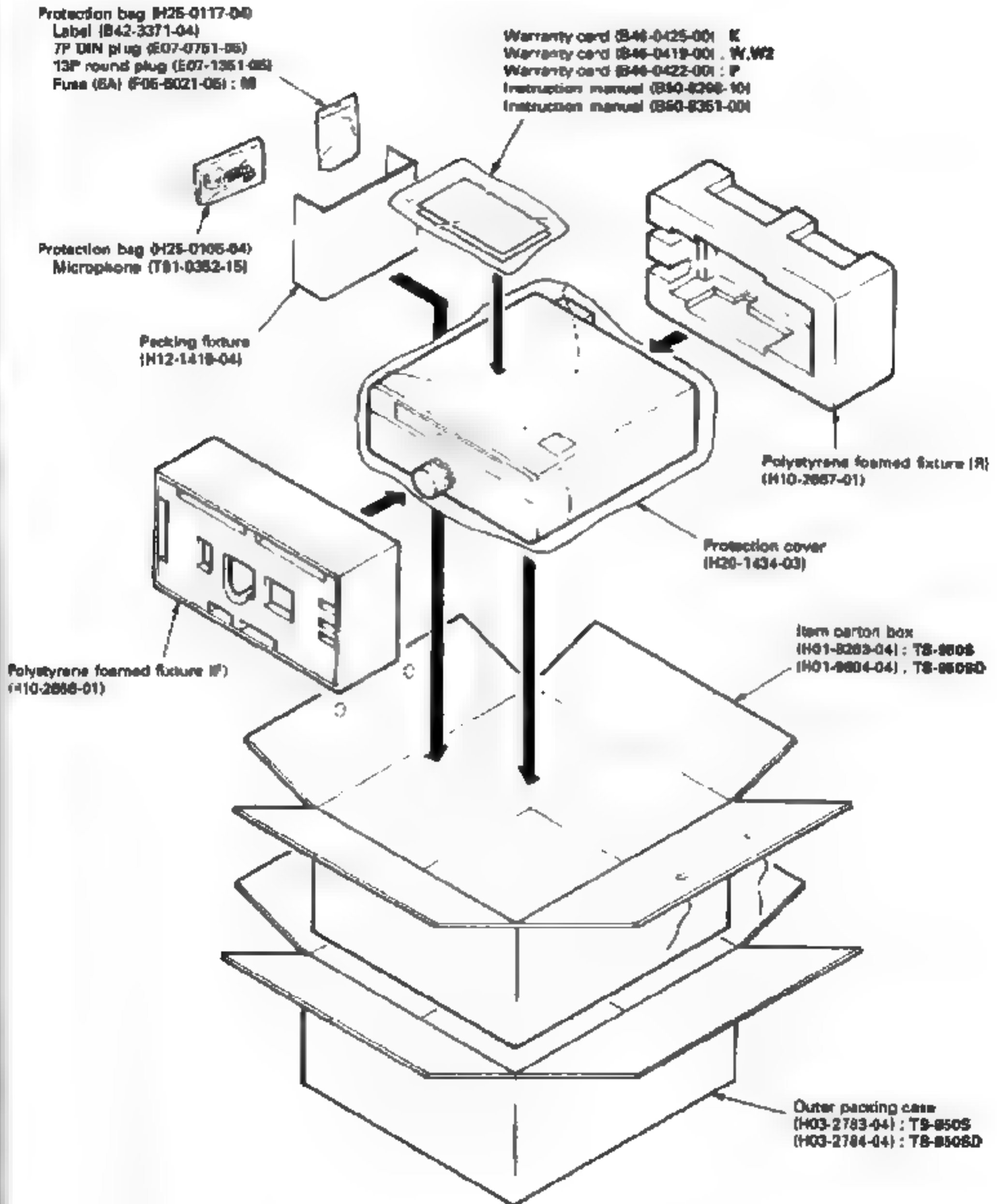


DISASSEMBLY

| | | |
|---|---------------------|---------------|
| A | M4 x 16 | : M00-0682-04 |
| K | M3 x 6 (Br-Tap) | : M87-3008-46 |
| L | M3 x 10 (Br-Tap) | : M87-3010-46 |
| P | M3 x 6 (Bl-Tap) BLK | : M88-3008-45 |
| T | M3 x 8 | : M30-3008-46 |
| L | M3 x 10 | : M30-3010-46 |
| W | M3 x 8 (Br-Tap) | : M87-3008-46 |



PACKING



ADJUSTMENT

Required Test Equipment

1. DC Voltmeter (DC V.M.)

- 1) Input resistance : More than 1M Ω
- 2) Voltage range : 1.5 to 1000V AC/DC

Note A high-precision multimeter may be used. However, accurate readings can not be obtained for high-impedance circuits.

2. DC Ammeter

- 1) Current range : 100mA, 1.5A, 15A. High-precision ammeter may be used.

3. RF VTVM (RF V.M.)

- 1) Input impedance : 1M Ω and less than 3pF, π or
- 2) Voltage range : 10mV to 300V
- 3) Frequency range : 10kHz to 500MHz

4. AF Voltmeter (AF V.M.)

- 1) Frequency range : 50Hz to 10kHz
- 2) Input resistance : 1M Ω or greater
- 3) Voltage range : 10mV to 30V

5. AF Generator (AG)

- 1) Frequency range : 200Hz to 5kHz
- 2) Output : 1mV or less to 1V, low distortion

6. AF Dummy Load

- 1) Impedance : 8 Ω
- 2) Dissipation : 3W or greater

7. Oscilloscope

Requires high sensitivity, and external synchronization capability (150MHz or greater)

8. Sweep Generator

- 1) Center frequency : 50kHz to 90MHz
- 2) Frequency deviation : Maximum ± 35 MHz
- 3) Output voltage : 0.1V or greater
- 4) Sweep rate : At least 0.5 sec/crt

9. Standard Signal Generator (SSG)

- 1) Frequency range : 50kHz to 50MHz
- 2) Output : -20dB/0.1 μ V to 120dB/V
- 3) Output impedance : 50 Ω
- 4) AM and FM modulation can be possible

Note Generator must be frequency stable

10. Frequency Counter (f counter)

- 1) Minimum input voltage : 50mV
- 2) Frequency range : 150MHz or greater

11. Noise Generator

Must generate gaussian noise containing harmonics beyond 30MHz

12. RF Dummy Load

- 1) Impedance : 50 Ω and 50 Ω
- 2) Dissipation : 150W or greater

13. Linear Detector

- 1) Frequency range : 30MHz

14. Power Meter

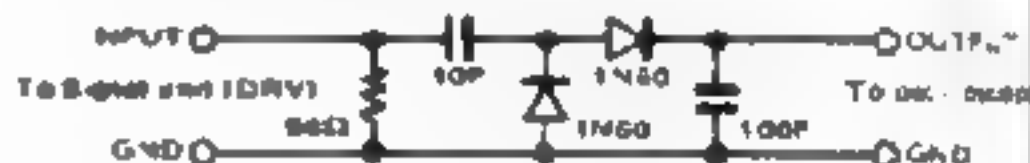
- 1) Impedance : 50 Ω
- 2) Dissipation : 300W continuous or greater
- 3) Frequency limits : 80MHz or greater

15. Spectrum Analyzer

- 1) Frequency range : 150kHz to 110MHz or greater
- 2) Bandwidth : 1kHz to 3MHz

16. Detector

- 1) For adjustment of TX BPF



- 2) For adjustment of PLL/VCO BPF



17. Directional Coupler

18. Monitor Receiver

R-1000 class

19. Microphone

MC-43S or MC-60/80S3

20. Tracking Generator

ADJUSTMENT

Preparation

Unless otherwise specified, set the controls as follows.

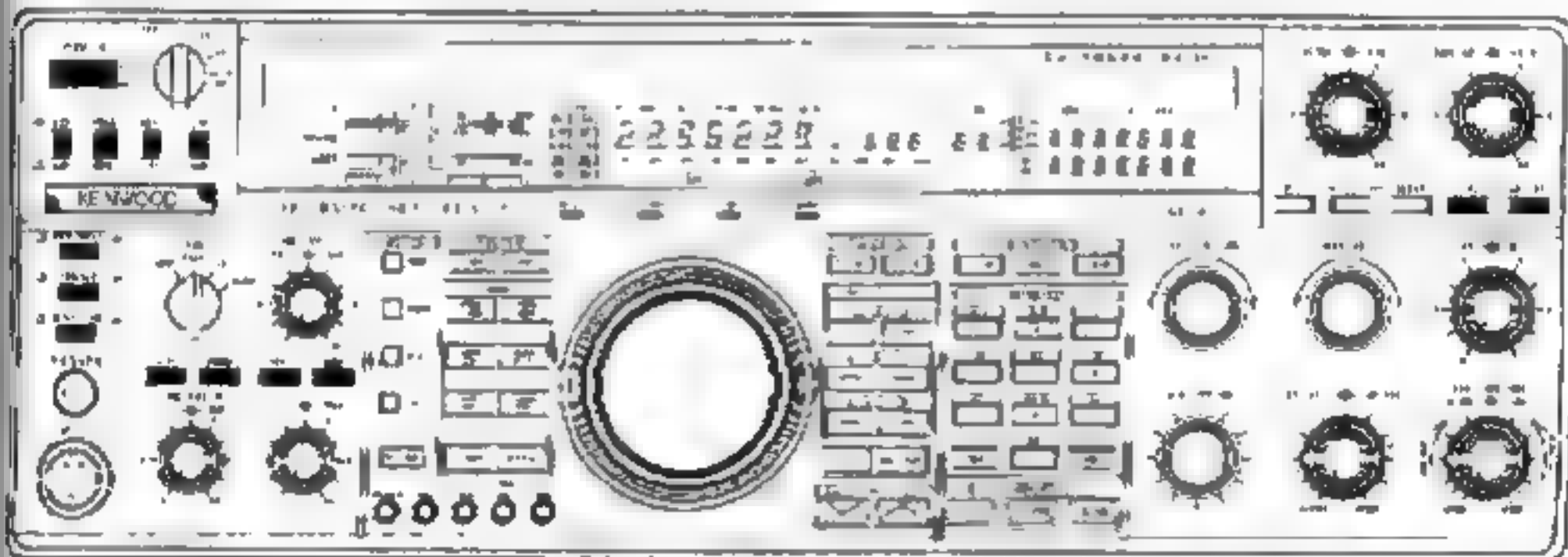
1. Power ON, holding A=B SW, keep ☐ condition from ☐ or ☐ SW's which marked ☐.

(Other push SW's are nonlock type or latched SW.)

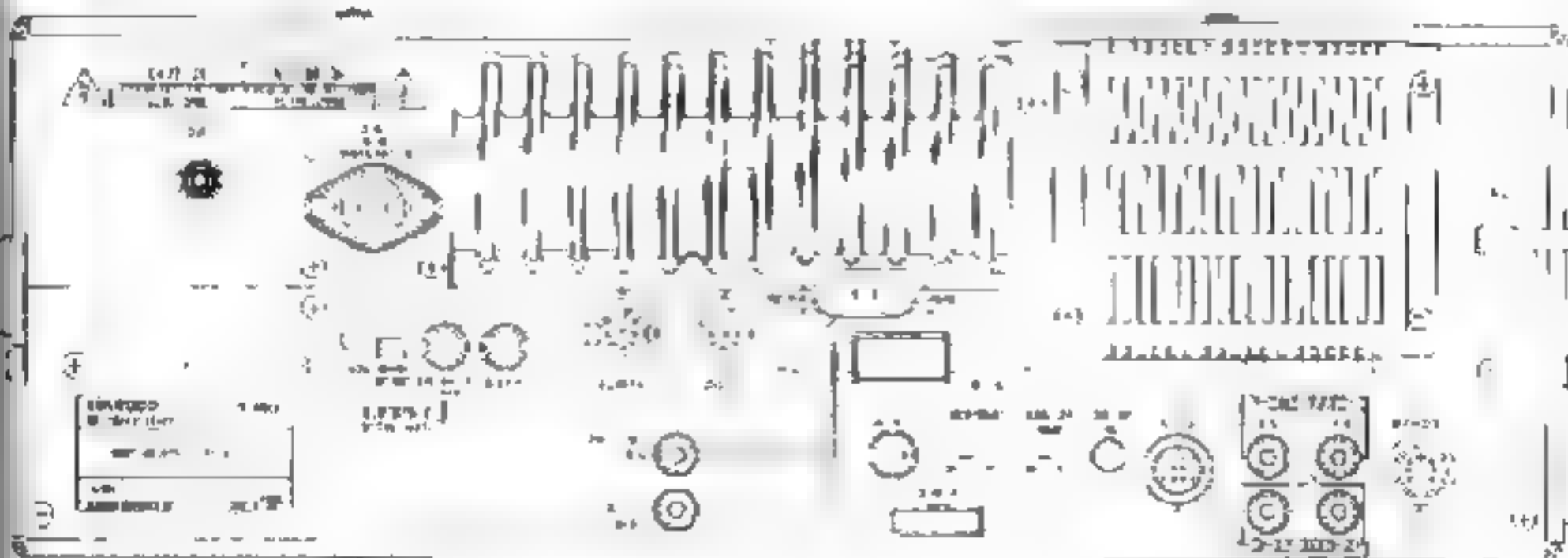
2. POWER ON
 ATT 0
 AGC FAST
 METER POWER
 AB LEVEL 0
 PROCESSOR IN 0
 PROCESSOR OUT 0

MIC 0
 PWR MAX
 NOTCH Centered
 SQL 0
 PTCH Centered
 AF 0
 RF MAX
 IF VBT NORMAL
 CW VBT NORMAL
 SSB SLOPE TUNE HIGH MAX
 SSB SLOPE TUNE LOW MAX

Front panel



Rear panel



ADJUSTMENT

Voltage check

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|-----------|---------------------------------------|----------------|-----------|----------|------------|-------|--------|------------------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1 Voltage | 1) POWER SW ON
STBY REC
MODE CW | DC V M | AVR (A/B) | TP1 | AVR (A/B) | VR1 | 15.0V | ±0.2V |

PLL and CAR section adjustment

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|--------------------------------|--|----------------------------------|-------------------|------------------|------------|-------------|--------------|------------------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| Reference OSC | 1) POWER SW ON
STBY REC
MODE CW | f counter | PLL | TP1 | CAR | TC1 | 20 000.000Hz | ±20Hz |
| 2 SCOPE sub marker | 1) Connect the SM-230 (±25kHz span) to SCOPE connector on the rear panel:
SUB ON
RX→SUB ON (MAIN→SUB)
MAIN DISP 10kHz up
SUB OFF | DC V M | Rear panel | SCOPE 7 pin | DIG | VR1 | 0V | ±0.01V |
| 3 EXT STD voltage adj. | 1) CAR unit S1 EXT
Connect the 10kHz/1Vp-p signal generator to EXT terminal (U1) | DC V M
10kHz signal generator | CAR
Rear panel | TP7
EXT INPUT | CAR | TC2 | 2.5V | ±0.2V |
| TS 950SD | 2) CAR unit S2 SO | f counter | PLL | TP1 | | | Check | 20.000.000MHz ± 20Hz |
| 4 VCO adj. | 1) MAIN DISP : 14.000.0MHz
MODE FM
STBY REC
2) MODE USB | DC V M | CAR | TP1 | CAR | L3 | 4.0V | ±0.2V |
| 4-1 VCO6 35.5MHz | | | | | | | | |
| 4-2 VCO6 71.5MHz | | | | TP2 | | L10 | 4.0V | ±0.2V |
| 4-3 VCO4 85.5MHz | | | | TP8 | | L17 | 4.0V | ±0.2V |
| 4-4 VCO9 69.5MHz | | | | TP4 | | L24 | 5.0V | ±0.2V |
| 5 HET adj. 9.285MHz | 1) MAIN DISP : 14.000.0MHz
MODE USB
STBY REC | Oscilloscope (100MHz) | CAR | TP6 | CAR | L14 | Level MAX | Ref 0.4Vp-p |
| 6 CAR adj. 10.695MHz | 1) MAIN DISP : 14.000.0MHz
MODE USB
STBY REC | Oscilloscope | CAR | TP8 | CAR | L21 | Level MAX | Ref 0.4Vp-p |
| 7 40MHz BPF adj. | 1) MAIN DISP : 14.000.0MHz
MODE USB
STBY REC | Oscilloscope | PLL | FB | PLL | L19,20 | Level MAX | Ref 0.6Vp-p |
| 8 VCO adj. VCO3 58-59MHz | 1) MAIN DISP : 14.000.0MHz
MODE FM
STBY REC
2) Turn to main tuning knob
MAIN DISP : 13.999.9MHz | DC V M | PLL | TP2 | PLL | L3 | 5.0V | ±0.2V |
| 9 12.65MHz BPF adj. | 1) MAIN DISP : 14.000.0MHz
MODE FM
STBY REC | Oscilloscope | PLL | TP3 | PLL | L7-9 | Level MAX | Ref 0.3Vp-p |
| 10. 34.1MHz BPF adj. | 1) MAIN DISP : 14.250.0MHz
MODE FM
STBY REC | Oscilloscope | PLL | TP4 | PLL | L10-
L12 | Level MAX | Ref 0.4Vp-p |
| 11. VCO adj. VCO2 48.5-44.5MHz | 1) MAIN DISP : 14.000.0MHz
MODE FM
STBY REC
2) Turn to main tuning knob
MAIN DISP : 13.999.9MHz | DC V M | PLL | TP5 | PLL | L15 | 6.0V | ±0.2V |
| | | | | | | | Check | 2.0-3.0V |

ADJUSTMENT






| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|--|--|----------------------------|------|----------|--------------|----------------|------------------------|---|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 12 Local
38.3MHz
BPF adj. | 1) MAIN DISP 14.250.0MHz
MODE FM
STBY REC | Oscilloscope | PLL | TP7 | PLL | L21-
L23 | Level MAX | Ref. 0.3Vp-p |
| 13. HET
50.750MHz
OSC adj. | 1) MAIN DISP 14.250.0MHz
MODE FM
STBY REC | Oscilloscope
f. counter | PLL | TP11 | PLL | L57

TC1 | Level MAX
50.750MHz | Ref. 0.3Vp-p
±50Hz |
| 14 VCO adj
VCOB
108-107MHz | 1) SUB DISP 14.000.0MHz
MODE FSK
SUB ON
STBY REC | DC V.M | PLL | TP8 | PLL | L31 | 5.0V | ±0.2V |
| | 2) Turn to sub tuning knob
SUB DISP 13.999.0MHz | | | | | | Check | 3.0-4.0V |
| 15 25.40MHz
BPF adj. | 1) SUB DISP 14.005.0MHz
MODE FSK
STBY REC | Oscilloscope | PLL | TP8 | PLL | L35-
L37 | Level MAX | Ref. 0.3Vp-p
Note: Adjust clockwise from
surface position (zero is
inserted) |
| 16. 12.54MHz
BPF adj. | 1) SUB DISP 14.005.0MHz
MODE FSK
STBY REC | Oscilloscope | PLL | TP10 | PLL | L41-
L43 | Level MAX | Ref. 0.4Vp-p |
| 17. 38.21MHz
BPF adj. | 1) SUB DISP 14.005.0MHz
MODE FSK
STBY REC | Oscilloscope | PLL | TP12 | PLL | L44-
L46 | Level MAX | Ref. 0.3Vp-p |
| 18. VCO adj
18-1 VCO7-A
40.065-
47.555MHz | 1) MAIN DISP 0.010MHz
SUB DISP 0.010MHz
MODE FSK
STBY REC | DC V.M | PLL | TP13 | PLL
(VCO) | TC4 | 2.8V | ±0.2V |
| | 2) SUB DISP 7.500MHz
MAIN DISP 7.490MHz | | | | | | Check | 8.0-11.0V |
| 18-2 VCO7-B
47.555-
54.555MHz | 1) MAIN DISP 7.500MHz
SUB DISP 7.500MHz | | | TP14 | PLL
(VCO) | TC3 | 2.8V | ±0.2V |
| | 2) SUB DISP 14.600MHz
MAIN DISP 14.490MHz | | | | | | Check | 8.0-11.0V |
| 18-3. VCO7-C
54.555-
61.555MHz | 1) MAIN DISP 14.500MHz
SUB DISP 14.490MHz | | | | PLL
(VCO) | TC2 | 2.8V | ±0.2V |
| | 2) SUB DISP 21.500MHz
MAIN DISP 21.490MHz | | | | | | Check | 8.0-11.0V |
| 18-4. VCO7-D
61.555-
70.055MHz | 1) MAIN DISP 21.500MHz
SUB DISP 21.500MHz | | | | PLL
(VCO) | TC1 | 2.8V | ±0.2V |
| | 2) SUB DISP 30.000MHz
MAIN DISP 30.000MHz | | | | | | Check | 8.0-11.0V |
| 19 VCO adj.
VCOB
64.22MHz | 1) STBY REC | DC V.M | AF | TP2 | AF
(VCO2) | TC | 5.0V | ±0.2V |
| 20. VCO adj.
20-1 VCO1-A
73.05-
80.55MHz | 1) MAIN DISP 0.010MHz
MODE FM
STBY REC | DC V.M | AF | TP1 | AF
(VCO) | TC1 | 2.8V | ±0.2V |
| | 2) MAIN DISP 7.490MHz | | | | | | Check | 8.0-11.0V |
| 20-2 VCO1-B
80.55-
87.55MHz | 1) MAIN DISP 7.500MHz | | | | AF
(VCO) | TC2 | 2.8V | ±0.2V |
| | 2) MAIN DISP 14.490MHz | | | | | | Check | 8.0-11.0V |
| 20-3 VCO1-C
87.55-
94.55MHz | 1) MAIN DISP 14.500MHz | | | | AF
(VCO) | TC3 | 2.8V | ±0.2V |
| | 2) MAIN DISP 21.490MHz | | | | | | Check | 8.0-11.0V |
| 20-4. VCO1-D
94.55-
103.05MHz | 1) MAIN DISP 21.500MHz | | | | AF
(VCO) | TC4 | 2.8V | ±0.2V |
| | 2) MAIN DISP 30.000MHz | | | | | | Check | 8.0-11.0V |


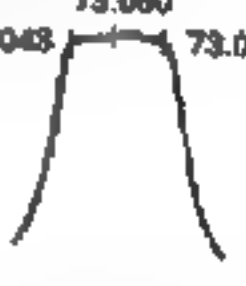

ADJUSTMENT

Receiver section adjustment

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------------------|---|---|------------|----------|-----------------|-------------|--------------------|---|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1 F VBT | 1) MAIN DISP 21.500MHz
MODE AM
IF VBT MAX | f counter | SIG | CN16-3 | SW(R)
(J/10) | VR5 | 355.0kHz | ±100Hz |
| 2 Slope tune | 1) POWER SW OFF
Push the POWER SW ON,
holding the 2 and 8 keys
SLOPE TUNE HI, LOW
Fully CW position
MODE USB
2) MODE LSB
After adjusted.
SLOPE TUNE LOW, NORMAL | f counter | SIG | CN16-3 | SW(B)
(K/10) | VR6 | 353.4kHz | ±100Hz |
| | | | | | | VR7 | 355.0kHz | ±100Hz |
| 3. PITCH | 1) POWER SW OFF→ON
PITCH Centered (12 o'clock)
MODE CW | f counter | IF | CN16-1 | SW(R)
(K/10) | VR9 | 10.6935MHz | +20Hz -0Hz |
| 4-1. MAIN AGC | 1) MAIN DISP 14.000MHz
MODE USB
RF GAIN MAX | DC V M | SIG | TP1 | SIG | VR3 | 2.8V | ±0.01V |
| 4-2. SUB AGC | 1) SUB ON
IF unit VR2 MIN
After adjusted
SUB OFF
IF unit VR2 Centered | | IF | TP2 | IF | VR3 | 2.8V | ±0.01V |
| 5-1 MAIN MIX BAL | 1) MAIN DISP 14.000MHz
AF VR MAX
After adjusted AF VR MIN | AF V.M | Rear panel | EXT SP | RF | VR12 | AF noise level MIN | |
| 5-2 SUB MIX BAL | 1) SUB ON
SUB DISP 14.000MHz
SUB AF VR MAX
IF unit VR2 MAX
After adjusted
SUB AF VR MIN
SUB OFF | | | | | VR11 | | |
| 6 BPF | 1) BAND 2.5-4.5MHz
MAIN DISP 3.500MHz
AP OFF
AGC OFF | Spectrum analyzer

Tracking generator | RF | TP3 | RF | L19-
L21 | | 2.5 4.5MHz
 |
| | 2) BAND 6.5-7.5MHz
MAIN DISP 7.000MHz | | | | | L25-
L27 | | 6.5 7.5MHz
 |
| | 3) BAND 9.5-11.0MHz
MAIN DISP 10.000MHz | | | | | L31
L33 | | 9.5 11.0MHz
 |
| | 4) BAND 13.5-15.0MHz
MAIN DISP 14.000MHz | | | | | L37
L39 | | 13.5 15.0MHz
 |
| | 5) BAND 20.5-22.0MHz
MAIN DISP 21.000MHz | | | | | L45-
L48 | | 20.5 22.0MHz
 |

ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | Specifications/Remarks |
|-------------------------|--|---|------------|----------------|------------|--|--|
| | | Test equipment | Unit | Terminal | Unit | Parts Method | |
| 8. BPF | 61 BAND 23.0-30.6MHz
MAIN DISP: 28.000MHz | Spectrum analyzer
Tracking generator | RF | TP3 | RF | L52-L64 | 23.0 30.6MHz
 |
| 9.1. MAIN VCF 73.050MHz | 1) MAIN DISP: 14.175MHz
Tracking generator output
-30dBm
Carrier frequency
73.050MHz | Spectrum analyzer
Spectrum analyzer | IF | TP3
CN6 | IF | L9-11 | Crest value MAX
Ripple MIN
Adjust as shown at right
73.043 73.050 73.057MHz
 |
| 9.2. SUB MCF 40.055MHz | 1) Center frequency
40.055MHz | Spectrum analyzer
Tracking generator | IF | TP1 | IF | L1 | 40.048 40.055 40.061MHz
 |
| 9.1. MAIN RX IF AMP | 1) MAIN DISP: 14.175MHz
MODE: USB
AGC: OFF
AIP: OFF
SUB AF VR: MIN
AF VR: 0.63V/80Ω
SSG f: 14.175MHz
SSG output: 5-0.5μV (-83--113dBm)
Note: Use the minimum input as possible
2) Set the indicator of FILTER 6.83 select switch to disappear position.
After adjusted
Set the FILTER select switch 2 kHz position. | SSG
DM. SP Decoupler
AF V.M. | Rear panel | ANT
EXT. SP | AF
IF | L87
L12-L17
L20.30
L24
L57 | Repeat for MAX AF output reading. |
| 9.2. SUB RX IF AMP | 1) SUB: ON
SUB DISP: 14.175MHz
MODE: USB
AF VR: MIN
SUB AF VR: 0.63V/80Ω
AF unit VR1: 12 o'clock
IF unit VR2: 12 o'clock
SSG f: 14.175MHz
SSG output: 5-0.5μV (-83--113dBm)
Note: Use the minimum input as possible
After adjusted
SUB: OFF | | | | IF | L28,29 | MAX for AF output |
| IF OUT1 | 1) SSG output: 50mV (-33dBm)
AGC: OFF | SSG
Oscilloscope | Rear panel | ANT
IF-OUT1 | IF | L18,19 | MAX for 8.63MHz signal output. |

ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|--------------------------------|---|---|------------|---------------|------------|---------------|---|---|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 10. NOTCH | 1) MAIN DISP 14.175MHz
MODE CW
NOTCH VR 12 o'clock
PITCH VR 12 o'clock
SUB AF VR MIN
SSG f 14.175MHz
SSG output 0.5μV (-113dBm) | SSG
DM SP
Oscilloscope
AF V M
f counter | Rear panel | ANT
EXT SP | From panel | AF VR
Main | Adjust for 1500Hz
0.63V/8Ω AF output | |
| | 2) NOTCH SW ON
SSG output 50μV (-73dBm) | | | | SIG | L8
VR2 | Repeat for M.M
AF output reading. | |
| | After adjusted
NOTCH SW OFF | | | | From panel | NOTCH VR | Check | Null point must occur between 11.00 ~ 13.00
Then AF output is less than 0.63V/8Ω |
| 11-1. MAIN S-meter and RX GAIN | 1) MAIN DISP: 14.175MHz
MODE USB
AFC OFF
HF GAIN VR, MAX
AMP OFF
SSG RF, OFF | SSG
RF dummy SP
Oscilloscope
AF V M
f counter | Rear panel | ANT
EXT SP | SIG | VR4 | Set the S-meter to 1 dot (just before 2 dots lights). | |
| | 2) AGC FAS ⁺
SSG f 14.175MHz
SSG output 0.9μV (-106dBm) | | | | | | | |
| | 3) SSG output 1.26μV (-105dBm) | | | | | | | |
| | 4) SSG output: 1μV (-107dBm) | | | | | | | |
| | 5) SSG output: 17.8μV (-75dBm) | | | | | | | |
| | 6) SSG output: 2μV (-81dBm) | | | | | | | |
| | 7) SSG output 1μV (-107dBm) | | | | | | | |
| | 8) Repeat item 1) to 7). | | | | | | | |
| | 9) SSG output: 3.55μV (-36dBm) | | | | | | | |
| | | | | | | | | |
| 11-2. SUB RX GAIN | 1) SUB ON
SUB DISP 14.175MHz
MODE USB
SSG f 14.175MHz
SSG output: 1μV (-107dBm)
After adjusted
SUB, OFF | DC V M | F | TP2 | IF | VR2 | 2.75V
Adjust for slowly. | ±0.03V |
| | | | | | | | | |
| | | | | | | | | |
| 12. FM GAIN | 1) MAIN DISP: 28.200MHz
MODE FM
SIG unit VR10 12 o'clock
SSG f 28.200MHz
SSG MOD 1kHz
SSG DEV 3kHz
SSG output 50μV (-73dBm) | SSG
RF dummy
Oscilloscope
SP
AF V M | Rear panel | ANT
EXT SP | SIG | L2B | MAX for AF output. | |
| | | | | | From panel | AF VR | Set to 0.63V/8Ω by AF GAIN volume. | |
| | 2) SSG MOD 1kHz
SSG DEV 5kHz
SSG output 50μV (-73dBm) | | | | SIG | VR10 | Adjust to 0.63V/8Ω AF output | |
| | 3) SSG DEV 3kHz | | | | | | Check AF output | 0.45V/8Ω or more. |



VR1 Set the S-meter to 3 dots (just before 4 dots lights)



VR5 S9+60dB (Full scale)

Check Within S9 +4, -8dB




Check S1 (3 dots) lights, ±3dB

Check SSG level of S9+60dB reading 3.66μV (-36dBm)

ADJUSTMENT

| Item | Measurement | Adjustment | | Specifications/Remarks | | | | | |
|----------------|---|--|------------|------------------------|----------|--------|--|--|-------------------|
| | | Test-equipment | Unit | | Terminal | Unit | Parts | Method | |
| 13. FM S-meter | 1) SSG f 28.200MHz
SSG MOD 1kHz
SSG DEV 3kHz
SSG output - 0.1.2μV (-66dBm)

2) SSG output 0.5μV (-71.3dBm) | SSG
8Ω dummy
Oscilloscope
AF VM | Rear panel | ANT
EXT SP | SIG | VR1* | Just before 80 dots lights


 | Check SSG level of S* reading. | -5-50dBμ |
| 4-1 MAIN | 1) MAIN DISP 21.200MHz
MODE : USB
SUB AF VR MIN
SUB NB VR MIN
NB1 SW ON
MAIN NB VR 12 o'clock

2) MAIN NB → SUB check
MAIN AF VR MIN
SUB NB VR MIN
MAIN NB VR 12 o'clock
NB1 SW ON
NB2 SW ON | Noise generator
SP | Rear panel | ANT
EXT SP | | | Adjust the noise generator output to S-meter 1 to 3 dots lights.
Adjust the MAIN NB LEVEL to just before NB operates has insufficient effect. | | |
| | | | | | AF | L13 14 | MIN noise level | Adjust the raise noise generator level to S1 and S9 then check | Noise disappears. |
| 4-2 SUB NB | 1) SUB ON
SUB DISP 21.200MHz
MODE : USB
MAIN AF VR MIN
MAIN NB VR MIN
NB1 SW ON
SUB NB VR 12 o'clock

2) SUB NB → MAIN check
SUB AF VR MIN
MAIN NB VR MIN
SUB NB VR 12 o'clock
NB1 SW ON
NB2 SW ON
After adjusted
SUB OFF
NB1, NB2 SW OFF | | | | | | Adjust the noise generator output to S-meter 1 to 3 dots lights.
Adjust the SUB NB LEVEL to just before NB operates has insufficient effect. | | |
| | | | | | IF | L21.22 | MIN noise level | Adjust the raise noise generator level to S1 and S9 then check | Noise disappears |
| 5. Beep tone | 1) AF VR MIN
CW key 1 push | DM. SP
Oscilloscope | Rear panel | EXT SP (A/3) | CONT | VR1 | 0.3Vp-p | 0.2-0.4Vp-p | |

ADJUSTMENT

Transmitter section adjustment

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|--------------------------|---|--|--------------------|-----------------------|-------------------|--------------------------|-----------------------------|---|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1 ALC voltage | 1) MAIN DISP 14.200MHz
MODE USB
PWR VR - MAX
STBY SEND | Digital voltmeter | IF | CN3-1 | CONT (A/3) | VR5 | 2.7V | ±0.05V |
| 2 CAR MIX & AMP | 1) MODE : AM
MIC VR MIN
STBY SEND | Oscilloscope | SIG | Center pin of the VR8 | SIG | L10-L12 | Repeat for MAX | 3Vp-p or more |
| 3 TX IF AMP | 1) MAIN DISP 7.050MHz
SW unit (A) VR11 (CAR VR) MAX
Disconnect the CN4 on the IF unit and connect the spectrum analyzer
STBY SEND | Spectrum analyzer | IF | CN4 | SIG
IF | L16,18
L23-L27
L31 | MAX for 73MHz signal output | Approx. 0dBm or more |
| 4 84.2MHz spurious | 1) MAIN DISP 7.050MHz
SW unit (A) VR11 (CAR VR) MAX
Disconnect the CN4 on the IF unit and connect the spectrum analyzer
STBY SEND
After adjusted
Connect the CN4 | Spectrum analyzer | IF | CN4 | IF | VR4 | MIN spurious level | |
| 5 8.83 MCF | 1) MAIN DISP 7.050MHz
SW unit (A) VR11 (CAR VR) MAX
MODE : AM
STBY : SEND | Tracking generator
Spectrum analyzer
brüel | IF
Filter (C/3) | CN17-1
CN12-2 | IF (Filter (C/3)) | L12,13 | |  |
| 6 TX IFT | 1) MODE AM
RF unit VR4-8 Centered
STBY SEND | Spectrum analyzer | Rear panel | DRW OUT | RF | L93-L95 | Repeat for MAX | |
| 7 MIX BIAS | 1) MAIN DISP 7.050MHz
MODE AM
STBY SEND | Spectrum analyzer | Rear panel | DRW OUT | RF | VR4 | MAX | |
| | 2) MAIN DISP 14.050MHz | | | | | VR5 | MAX | |
| | 3) MAIN DISP 29.000MHz | | | | | VR6 | MAX | |
| 8 MIX BAL | 1) MAIN DISP 21.000MHz
MODE AM
STBY SEND | Spectrum analyzer | Rear panel | DRW OUT | RF | VR3 | MIN 31MHz spurious level | |
| 9-1 FNA _L Vcc | 1) MAIN DISP 21.000MHz
MODE CW
Final unit VR1, 2 MIN
STBY SEND | DC V M | Final | Fuse | Final | VR3 | 48.0V | ±0.5V |
| 9-2 Drive bias | 1) MODE : USB
STBY SEND | Ammeter | | TP1 | | VR1 | 170mV | 165-175mV |
| 9-3 Final bias | | | | TP2 | | VR2 | 75mV | 24.5-26.5mV |
| 10 NULL | 1) MAIN DISP 14.200MHz
MODE : AM
Control unit
VR6 : Centered
VR7 : MAX
VR12 : MAX
SW unit (A) VR11 (CAR VR) MIN
STBY SEND | Power meter | Rear panel | ANT | SW(A) (J1 D) | VR11 | Approx. 10W | |
| | | DC V M | Filter | CN8-1 | Filter | TC1 | MIN DC V.M level | 0V |

ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|-------------------------------------|--|--|---------------------------|-------------|---------------|------------------------|---|---|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 11 IC meter | 1) METER IC ON
SW unit (A) VR11 (CAR VR)
MIN
STBY : SEND | DC V.M | Final | TP2 | SW/A
L/10 | VR11 | 0.4V | Check, IC meter 4 dots will disappear when adjust the CAR VR to 0.38V or more |
| | | | | | CONT
(A/3) | VR4 | IC meter 4 dots lights | |
| 12 IC protection | 1) SW unit (A) VR11 (CAR VR)
MIN
Control unit
VR12 : MAX
VR6 : MIN
VR7 : MAX
Adjust while slowly raising CAR VR, then 200W
Note : Please adjust VR6 and VR12 immediately, because power output will appear over 200W. | Power meter | Rear panel | ANT | CONT
(B/3) | VR12 | 180W | |
| | | | | | CONT
(A/3) | VR6 | 185W | |
| 13 ALC | 1) MAIN DISP 14.200MHz
MODE CW
FULL ON
SW unit (A) VR11 (CAR VR)
MIN
Control unit VR12 MIN
STBY SEND | Power meter | Rear panel | ANT | SW/A
L/10 | VR11 | Slowly increase to MAX | |
| | | | | | CONT
(B/3) | VR12 | 10W | 00-120W |
| 14 ALC frequency response | 1) MAIN DISP 24.900MHz
STBY SEND
2) MAIN DISP 14.200MHz
STBY : SEND | Power meter | Rear panel | ANT | Filter | VR1 | 10W | 100-120W |
| | | | | | | | Check if less than 100W, readjust item 13. | 100-120W |
| 15 Power meter | 1) MAIN DISP 14.200MHz
MODE CW
STBY SEND | Power meter | Front panel | Power meter | Front panel | PWR VR | 100W | |
| | | | | | CONT
(B/3) | VR11 | Set the PWR meter of display to 100W segment | 100W segment will disappear when adjust the CAR VR to less than 97W. |
| 16 Carrier suppression | 1) MAIN DISP 14.200MHz
MIC VR : MIN
SW unit (A) VR11 (CAR VR)
MAX
MODE : USB/LSB
PWR VR MAX
STBY SEND
Spectrum analyzer conditions
SPAN : 10kHz
RBW : 300Hz
VIDEO F.L. : 300Hz
TIME : 500ms | Power meter
Directional coupler
Spectrum analyzer | Rear panel | ANT | S/G | TC1
VR9 | MIN adjust after-nately
Adjust for no difference between USB and LSB | 45dB or less |
| 17 MAIN SSB mode frequency response | 1) POWER SW OFF
Push the POWER SW ON holding the 1 and 7 keys down.
PROC OFF
MODE USB/LSB
MIC terminal : 2-tone
AG1 : 900Hz/5mV
AG2 : 3.5kHz/5mV
MIC VR Set to starting point of ALC meter
STBY SEND
Set the FILTER select 8.83 to 6kHz when transmit | Power meter
Directional coupler
Oscilloscope
AG
AF V.M | Rear panel
Front panel | ANT
MIC | DIG | VR4 (USB)
VR3 (LSB) | Adjust as shown at right. | |

OK



NG

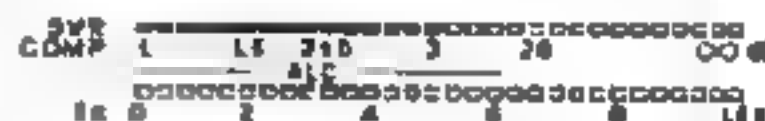
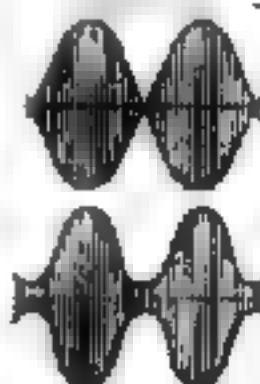


ADJUSTMENT

| Item | Condition | Measurement | | Adjustment | | Specifications/Remarks |
|---------------------------------------|---|---|---------------------------|------------|-----------|------------------------|
| | | Test equipment | Unit | Terminal | Unit | Parts |
| 17-1 MAIN SSB mode frequency response | * Receive sound
Push the POWER SW ON holding the 3 and 9 keys down. | Power meter
Directional coupler
Oscilloscope | Rear panel | ANT | 7MG | VR4 (USB)
VR3 (LSB) |
| 17-2 SSB mode frequency response | 1) MAIN DISP 14.200MHz
MODE USB/LSB
MIC terminal 2-tone
AG1: 1kHz/5mV
AG2: 3.4kHz/5mV
MIC VR: Set to starting point of ALC meter
STBY, SEND
Set the FILTER select 800 to 2.4kHz when transmit. | AG
AF V.M | Front panel | MIC | | VR2 |
| 17-3 SSB mode frequency response | 1) MAIN DISP 14.220MHz
POWER SW: OFF
Push the POWER SW ON holding the 3 and 9 keys down.
SJB ON
AF VR MIN
SJB AF VR MAX
MODE USB/LSB
STBY SEND | | | SP | | VR5 |
| 18. PROC AMP | 1) MAIN DISP 14.200MHz
MODE USB
PROC SW ON
METER COMP ON
PROC OUT VR MAX
MIC terminal 2-tone
AG1: 1kHz/5mV
AG2: 3.4kHz/5mV
STBY SEND
After adjusted
POWER SW OFF → ON
PROC SW OFF | Power meter
Directional coupler
Oscilloscope
AG
AF V.M | Rear panel
Front panel | ANT
MIC | SIG | L24 25 |
| 19. Carrier suppression check | 1) MODE USB/LSB
MIC VR MIN
SW unit (A) VR11 (CAR VR) MAX
PWR VR MAX
STBY: SEND | Power meter
Directional coupler
Spectrum analyzer
Oscilloscope | Rear panel | ANT | | Check |
| 20. SWR protection | 1) MAIN DISP 14.200MHz
MODE AM
Comp unit VR7 MIN
ANT Connect the through line power meter and 150Ω dummy load.
STBY SEND | Through line power meter
150Ω dummy | Rear panel
Front panel | ANT | CON1 (V3) | VR7 |
| 21 SWR meter | 1) MAIN DISP 14.800MHz
METER SWR Push
ANT Connect the 150Ω dummy load.
STBY: SEND | 150Ω dummy | Rear panel
Front panel | ANT | CON1 (V3) | VR8 |
| 22 MAIN power setting | 1) MAIN DISP 14.200MHz
PWR VR MIN
STBY, SEND
After adjusted
PWR VR MAX | Power meter | Rear panel | ANT | CON1 (V3) | VR10 |

OK

NG



ADJUSTMENT

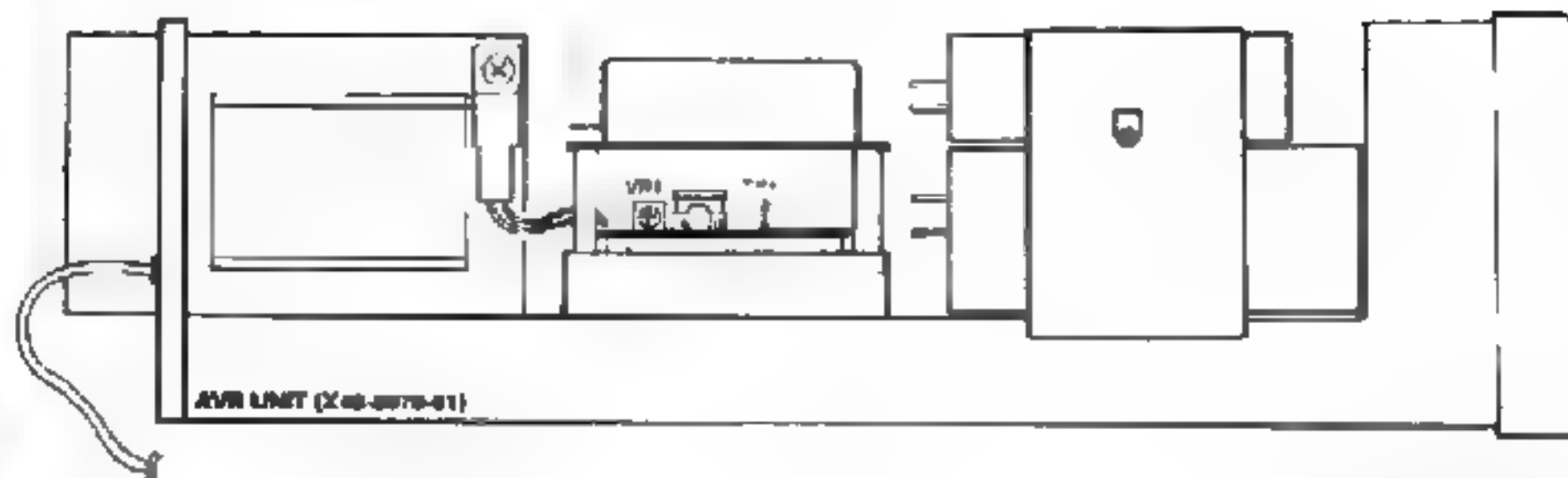
| Item | Condition | Measurement | | | Adjustment | | | | Specifications/Remarks |
|--------------------------|---|---|-------------|----------------|-------------|------------|--|---|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | | |
| 23-1 ALC meter ZERO | 1) MAIN DISP 14.200MHz
MODE USB
Control unit (A/3) VR3
Centered
STBY - SEND | DC V M | CONT (A/3) | VR3 | CONT (A/3) | VR2 | 0.01V | $\pm 0.001V$ | |
| 23-2 ALC meter FULL | 1) MIC terminal AG (1kHz/5mV)
METER ALC Push
STBY SEND | Power meter | Rear panel | ANT | Front panel | MIC GAIN | Set the MIC GAIN VR to 1 dot of ALC meter (just before 1 dot light) | | |
| | 2) MIC terminal AG (1kHz/10mV)
STBY SEND | AG
AF V.M | Front panel | MIC ALC meter | CONT (A/3) | VR3 | Adjust for MAX A.C zone reading | | |
| 24 PROC meter | 1) MODE USB
METER COMP Push
PROC SW ON
MIC terminal AG (1kHz/1mV)
STBY SEND | Power meter | Rear panel | ANT | Front panel | PROC IN VR | Set the PROC IN VR to 1 dot of COMP meter (just before 1 dot light) | | |
| | 2) MIC terminal AG (1kHz/10mV)
STBY SEND
After adjusted
PROC SW OFF | AG
AF V.M | Front panel | MIC COMP meter | CONT (A/3) | VR9 | Adjust for 20dB COMP meter | | |
| 25-1 FM MIC DEV | 1) MAIN DISP 29.050MHz
MODE FM
FILTER 455 12kHz
MIC terminal AG (1kHz/30mV)
STBY SEND | Power meter
Directional coupler
Linear detector
Oscilloscope | Rear panel | ANT | AF | VR5 | DEV ± 4 Bdr | | |
| 25-2 MIC GAIN | 1) MIC terminal AG (1kHz/3mV) W, VR2, X
AG (1kHz/5mV) K, M, P
STBY SEND | AG
AF V.M | Front panel | MIC | | VR6 | DEV ± 3 0kHz | $\pm 0.1kHz$ | |
| 25-3 MIC GAIN IFM narrow | 1) FILTER 455 6kHz
MIC terminal AG (1kHz/30mV)
STBY SEND | | | | | VR4 | DEV ± 2 3kHz | $\pm 0.1kHz$ | |
| | 2) MIC terminal AG (1kHz/3mV) W, VR2, X
AG (1kHz/5mV) K, M, P
STBY SEND | | | | | | Check | DEV $\pm 1.4 \sim 1.0kHz$ | |
| 26 SUB TONE | 1) MAIN DISP 29.700MHz
MODE FM
FUNCTION IX VFO - B
A+B key 1 push
TONE ON
MIC terminal Open
STBY - SEND
After adjusted
TONE OFF
IX VFO A | Power meter
Directional coupler
Linear detector
Oscilloscope
AF V.M | Rear panel | ANT | AF | VR3 | Check that SUB TONE indication will appear to 88 5c
DEV $\pm 600Hz$ | Please press the TONE key if disappeared
+60Hz | |
| 27 FM carrier | 1) MAIN DISP 29.700MHz
MODE FM
METER ALC ON
MIC terminal Open
STBY SEND | Power meter
Directional coupler | Rear panel | ANT | SIG | VR6 | Adjust for MAX ALC zone reading. | | |
| 28-1 DSP TS-950SD | 1) DSP Link
S1 1
S2 4
S3-1 OFF
S3-2 OFF
S3-3 OFF
S3-4 ON
TP6 Short (ON) | Power meter | Rear panel | ANT | IF | VR5 | Set to mechanical centered point. | | |

ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|--------------------------|--|------------------------------|------------|----------|-------------|-------------|---|--|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 28-2 GAIN 1 | 2) MAIN DISP 14.200MHz
MODE AM
METER ALC ON
STBY SEND | Power meter | Rear panel | ANT | SIG | L22 | Power MAX | Set the SW unit (A) VR11 (CAR VR) to 10V.
Also decrease the CAR VR to no ALC reading when adjust item 28-2. |
| 28-3 GAIN 2 | 3) MODE USB
STBY SEND | | | | | VR8 | Adjust for full scale of ALC meter | |
| 28-4 FM GAIN | 4) MAIN DISP 28.700MHz
MODE FM
METER ALC ON
STBY SEND | | | | | VR7 | Adjust for MAX ALC zone reading. | |
| 29 DSP MIC GAIN TS-950SD | 1) MIC terminal AG (1kHz/5mV)
STBY SEND | Power meter | Rear panel | ANT | Front panel | MIC GAIN VR | Set the MIC GAIN VR to 1 dot of ALC meter (just before 1 dot light) | |
| | 2) MIC terminal AG (1kHz/10mV)
STBY SEND | | | | DSP | VR1 | Adjust for MAX ALC zone reading. | |
| 30 DSP unit VCO TS-950SD | 1) Connect the two DSP connector to the rear panel.
MAIN DISP: Any frequency
STBY SEND | DC V M | DSP | TP6 | DSP | L12 | 4V | ±0.2V |
| 31 Monitor level | 1) MAIN DISP 21.050MHz
MODE USB
MONI SW: ON
MONI VR: 12 o'clock
ALC SW: ON
MIC terminal AG (1kHz/10mV)
STBY SEND
MIC VR ALC zone MAX | Power meter | Rear panel | ANT | IF | VR1 | Set to mechanical centered point | |
| | | DM SP Oscilloscope
AF V M | | EXT SP | | | Check | 0.3-1.0V/8Ω |
| 32 CW sidetone | 1) MAIN DISP 21.050MHz
MODE CW
MONI SW: OFF
PITCH VR: 12 o'clock
VOX SW: ON
FUNCTION TX: A
FUNCTION RX: A
Rear panel
ELECTRONIC KEY: OFF
LINEAR AMP: ON | Power meter
" counter | Rear panel | ANT | AF | VR2 | Adjust to 0.2V/8Ω with key down. | ±0.02V |
| | | AF V M | | EXT SP | | | | |
| 33 Auto antenna tuner | 1) MAIN DISP 1.900MHz
MODE CW
AUTO/THRU: AUTO
AT TUNE: ON | Oscilloscope
50Ω dummy | Rear panel | ANT | AT (A/B) | VR1 | Adjust VR1 to fully CCW position. Adjust VR1 as slowly increase. 2 dots of SWR meter just goes off. | |
| | | SWR meter (front panel) | | | | VR2 TC1 | Set to mechanical centered point. | Do not hang-up when tuning in 28MHz bands. |
| | | 150Ω dummy | | | | | Check | Motor stop until all band |

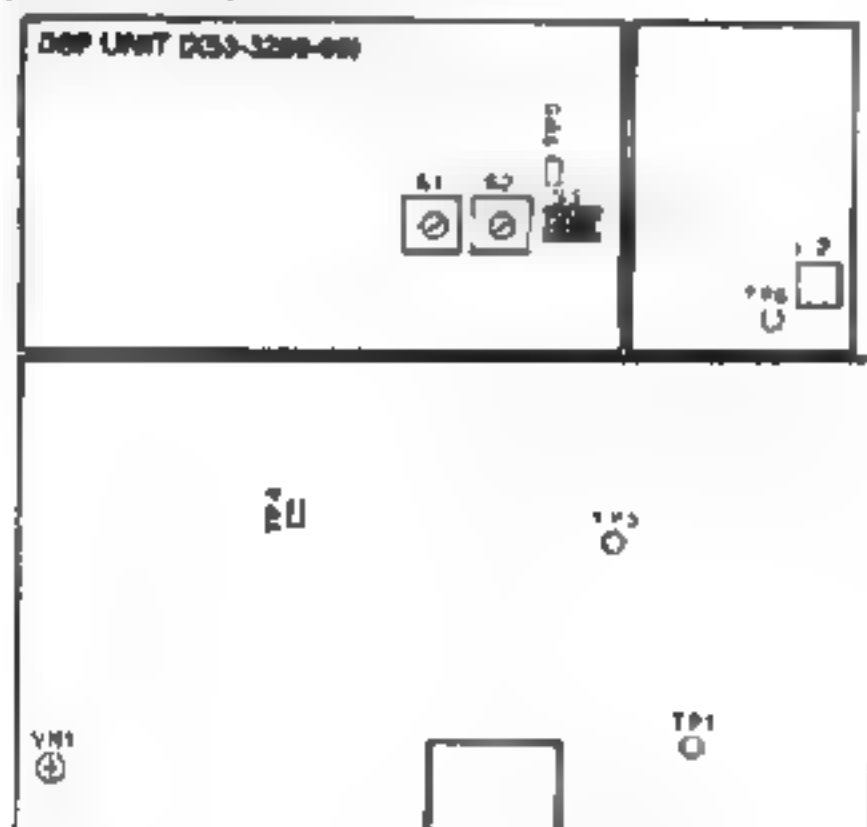
ADJUSTMENT

Adjustment points (AVR unit)



AVR UNIT (X40-3070-01)
VR1 15V adj.

Adjustment points (DSP unit)



DSP UNIT (X33-3200-00)
L12 VCO
VR1 MIC GAIN

CAR UNIT (X30-3110-00)

L3 VCO5 (35.5MHz)
L10 VCO6 (71.5MHz)
L14 HET 278MHz
L17 VCO4 (89.5MHz)
L21 CAR (119.5MHz)
L24 VCO9 (132.5MHz)
TC1 Ref OSC (120MHz)
TC2 EXT STD voltage

FLL UNIT (X10-3100-00)

L3 VCO3 (55-56MHz)
L7-9 12.6MHz BPF
L10-12 34.1MHz BPF
L15 VCO2 (48.5-49.5MHz)
L19-20 40MHz BPF
L23-29 LOCAL (35.3MHz) BPF
L31 VCO8 (109-107MHz)
L36-37 25.40MHz BPF
L41-43 12.56MHz BPF
L44-45 38.21MHz BPF
L57 HET (50.7MHz) OSC
TC1 HET (50.75MHz) OSC

VCO (X30-3000-01)

TC1 VCO7-D (51.555-70.055MHz)
TC2 VCO7-C (54.055-81.555MHz)
TC3 VCO7-B (47.555-54.555MHz)
TC4 VCO7-A (40.055-47.555MHz)

RF UNIT (X40-3100-00)

L19-21 2.5-4.5MHz BPF
L26-27 8.5-7.5MHz BPF
L31-33 8.5-11.0MHz BPF
L37-39 13.5-15.0MHz BPF
L46-48 20.5-22.0MHz BPF
L52-54 23-30.5MHz BPF
L77-80 SUB MCF (40.055MHz)
L87 MAIN RX IF AMP
L93-95 TX IF
TC1 73.05MHz trap
VR1 RX SUB MIX balance
VR2 RX MAIN MIX balance
VR3 TX MIX balance
VR4 TX MIX bias (7MHz)
VR5 TX MIX bias (14MHz)
VR6 TX MIX bias (23MHz)

AF UNIT (X40-3020-00)

L13,14 MAIN NB GAIN
VR1 VBT (Continued)
VR2 CW sidetone
VR3 SUB TONE DEV.
VR4 Narrow FM MIC GAIN
VR5 FM MIC DEV
VR6 MIC GAIN

VCO2 (X10-3000-00)

TC1 VCO8 (64.22MHz)

VCO (X10-3000-00)

TC1 VCO1-A (73.05-80.55MHz)
TC2 VCO1-B (80.55-87.55MHz)
TC3 VCO1-C (87.55-94.55MHz)
TC4 VCO1-D (94.55-103.05MHz)

IF UNIT (X40-3000-00)

L1 8 RX SUB IF AMP
L9-11 RX MAIN MCF
L12-17 RX MAIN IF AMP
L18,19 IF OUT1
L20 TX MAIN IF AMP
L21,22 SUB NB GAIN
L23-27 TX IF AMP
L28-30 RX MAIN IF AMP
L31 TX IF AMP
VR1 MONI level
VR2 SUB RX GAIN
VR3 SUB AGC
VR4 64.2MHz TX spurious
VR5 DSP (TS-950SD)

FILTER UNIT (X31-3000-00) (C/F)

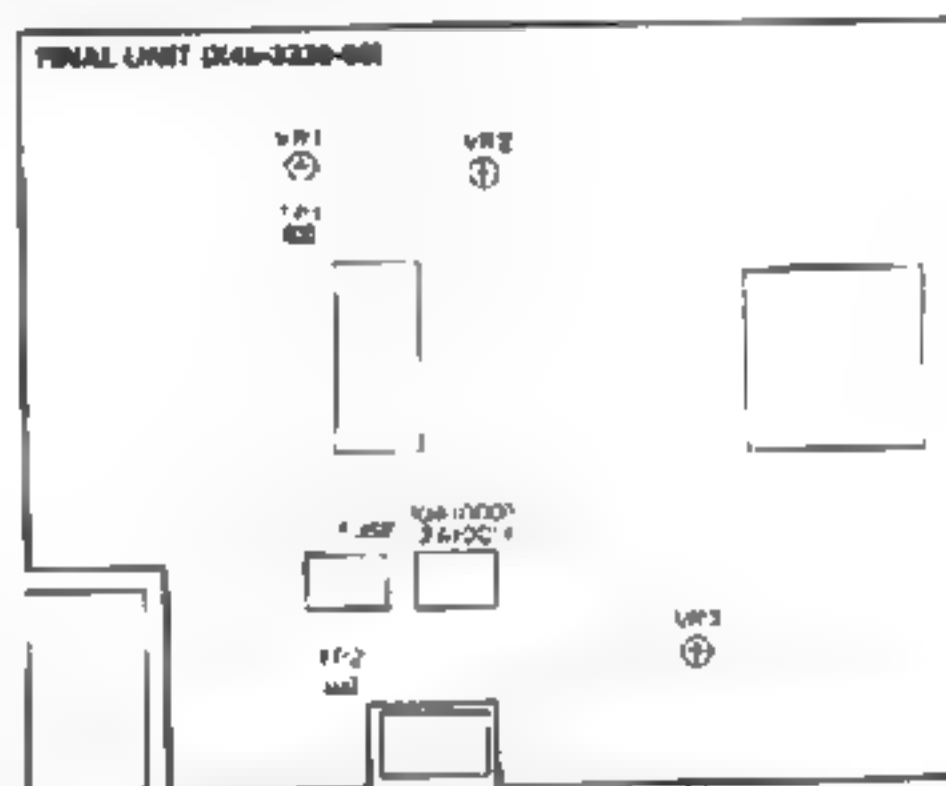
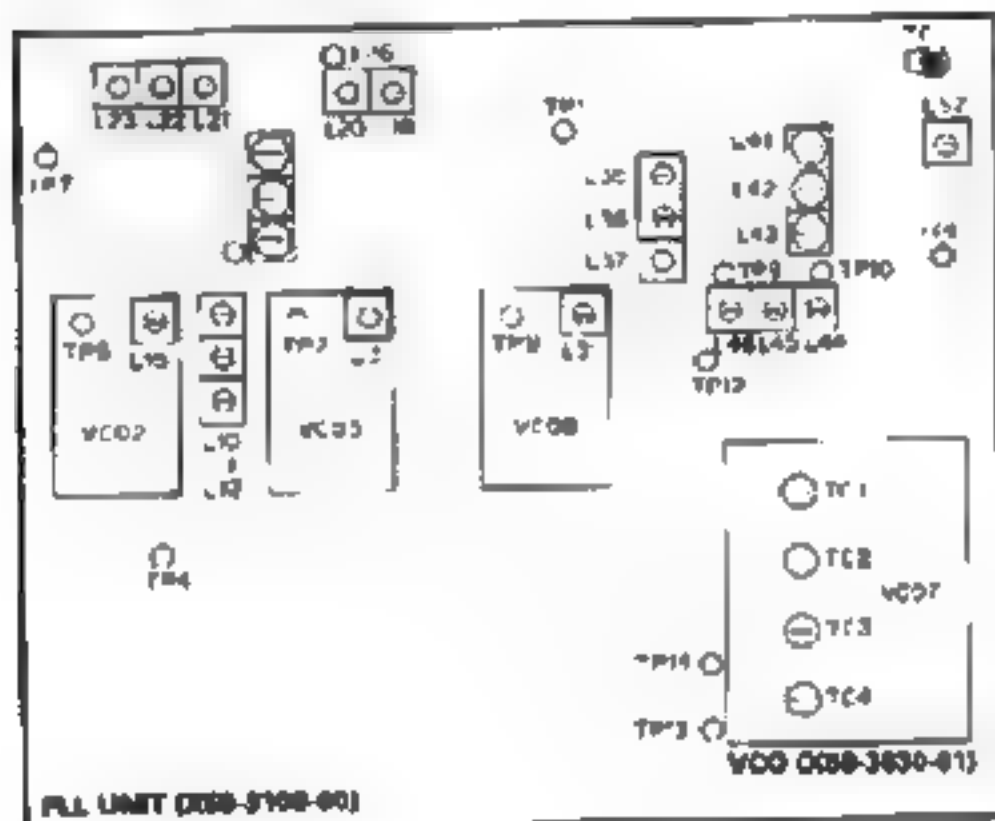
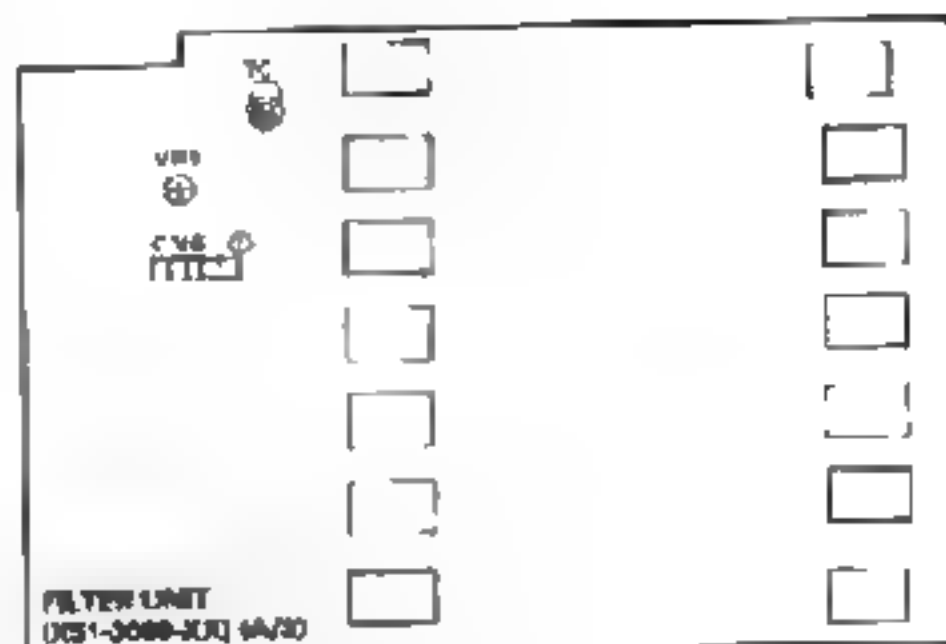
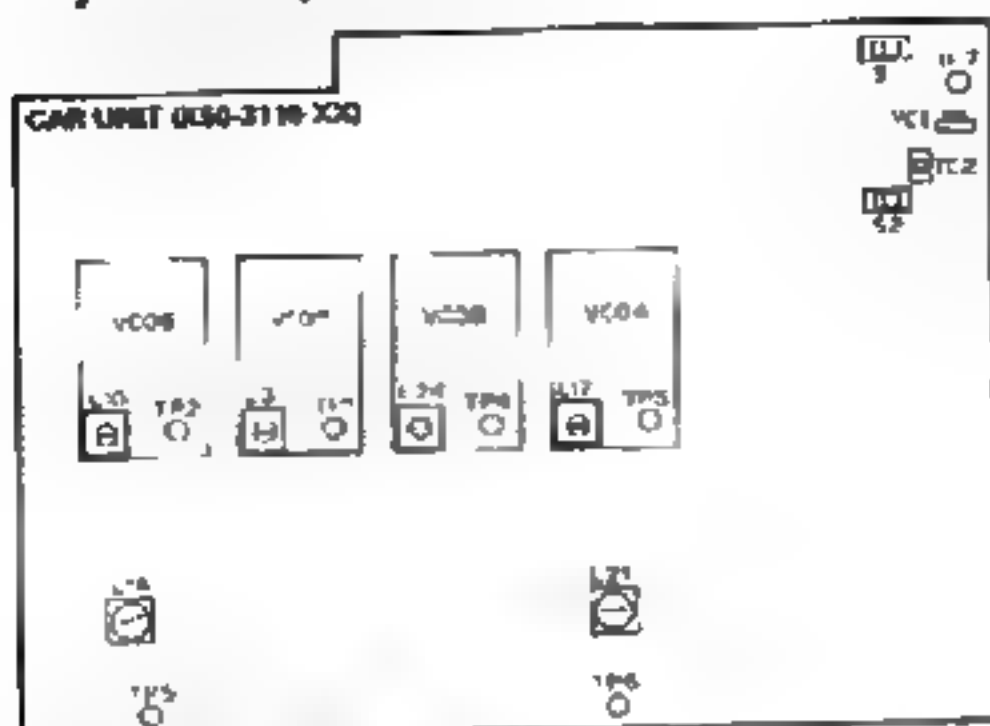
L12,13 8.63MHz MCF

SIGNAL UNIT (X37-3000-00)

L2,4,5,7 RX MAIN IF AMP
L6 NOTCH
L10-12 TX CAR MIX & AMP
L15,16 TX IF AMP
L22 DSP GAIN (AMB)
L24,25 PROC AMP
L28 RX FM GAIN
TC1 CAR suppression
VR1 MAIN 558 S-1
VR2 NOTCH
VR3 MAIN AGC
VR4 MAIN RX GAIN
VR5 MAIN 558 S-9
VR6 TX FM CAR level
VR7 DSP GAIN (FM)
VR8 DSP GAIN (SSB)
VR9 CAR suppression
VR10 RX FM GAIN
VR11 RX FM S-meter

ADJUSTMENT

Adjustment points (Upper side)



CONTROL UNIT (K53-3230-000) (A/R)

VR1 Bump tone
VR2 ALC meter 0
VR3 ALC meter full
VR4 IC meter
VR5 ALC voltage
VR6 IC protection
VR7 SWR protection
VR8 SWR meter
VR9 PROG meter

CONTROL UNIT (K53-3230-000) (B/R)

VR10 1K MIN power setting
VR11 Power meter
VR12 HF power
VR13 Not used

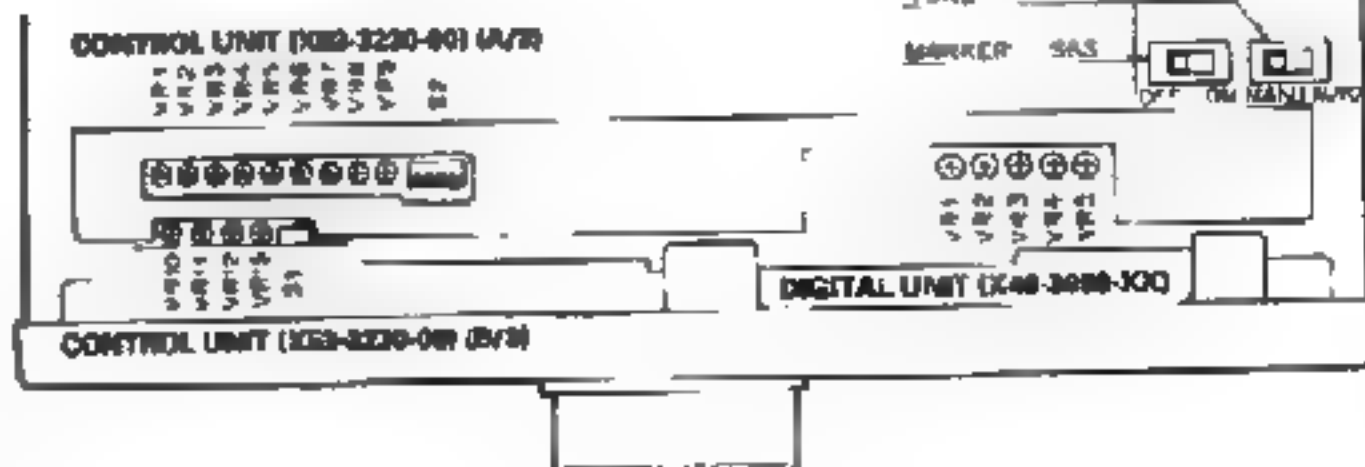
SWITCH UNIT (A) (K41-3088-000) (A/R)

VR8 MANUAL TONE VR (Centered)
VR9 MANUAL TONE VR (Centered)
VR10 DIMMER (Centered)
VR11 CAR level

DIGITAL UNIT (K46-3088-X00)

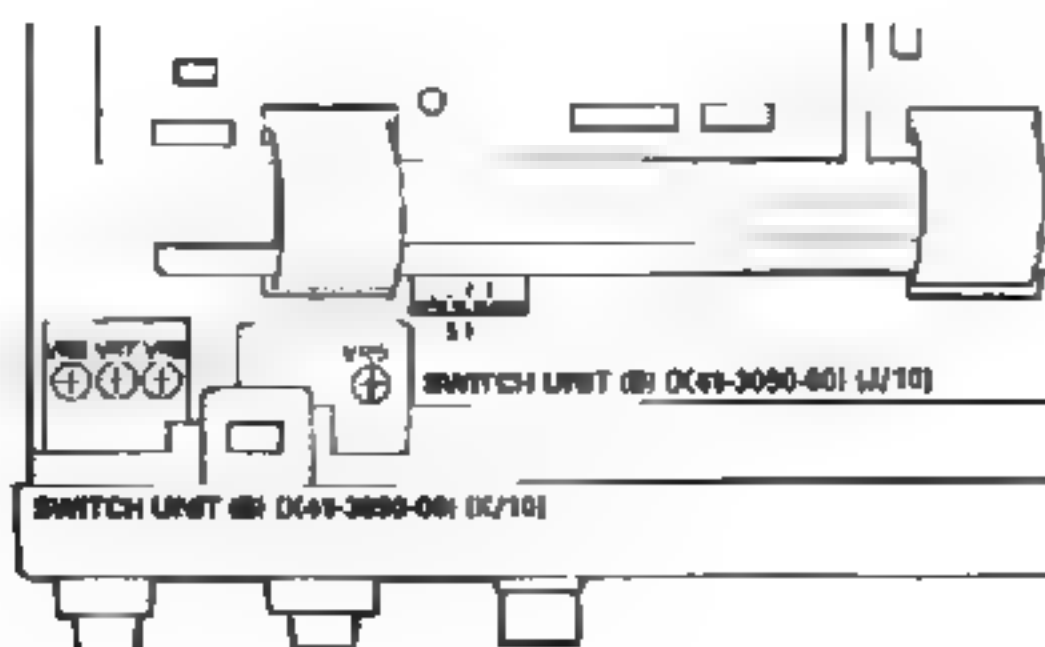
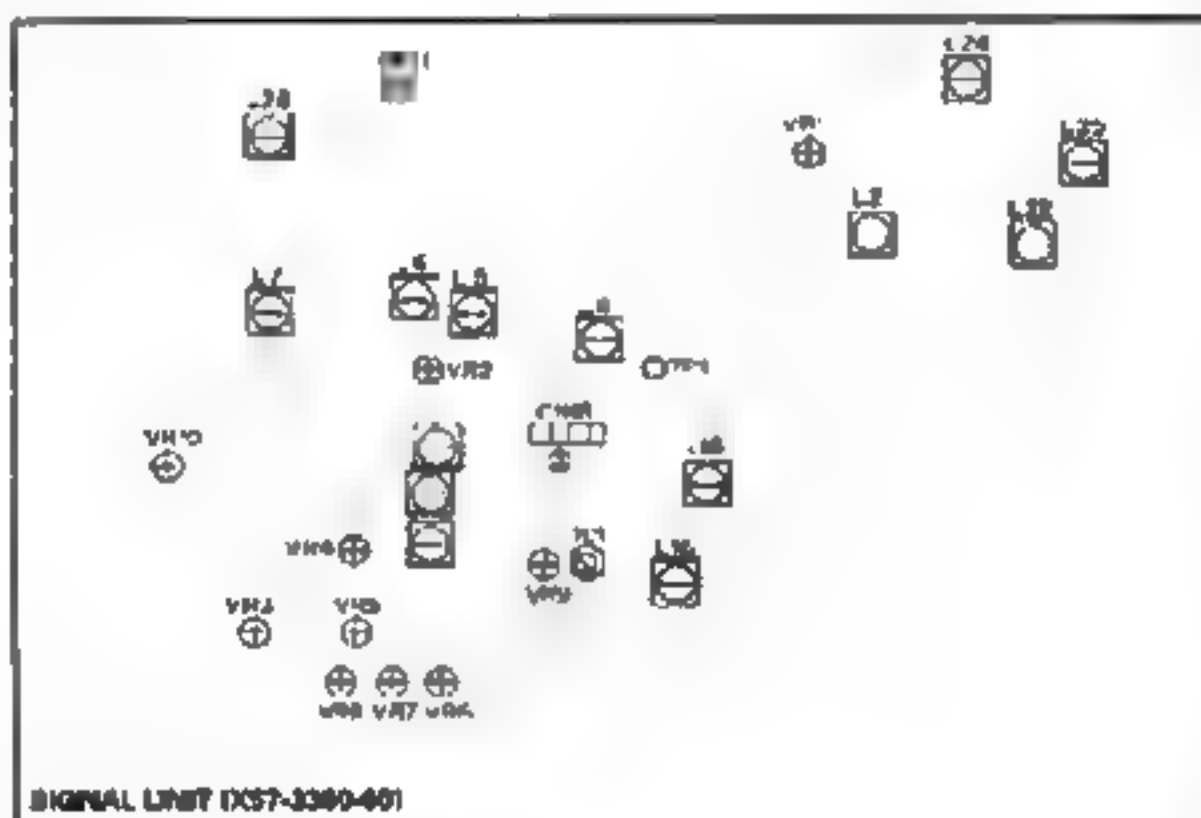
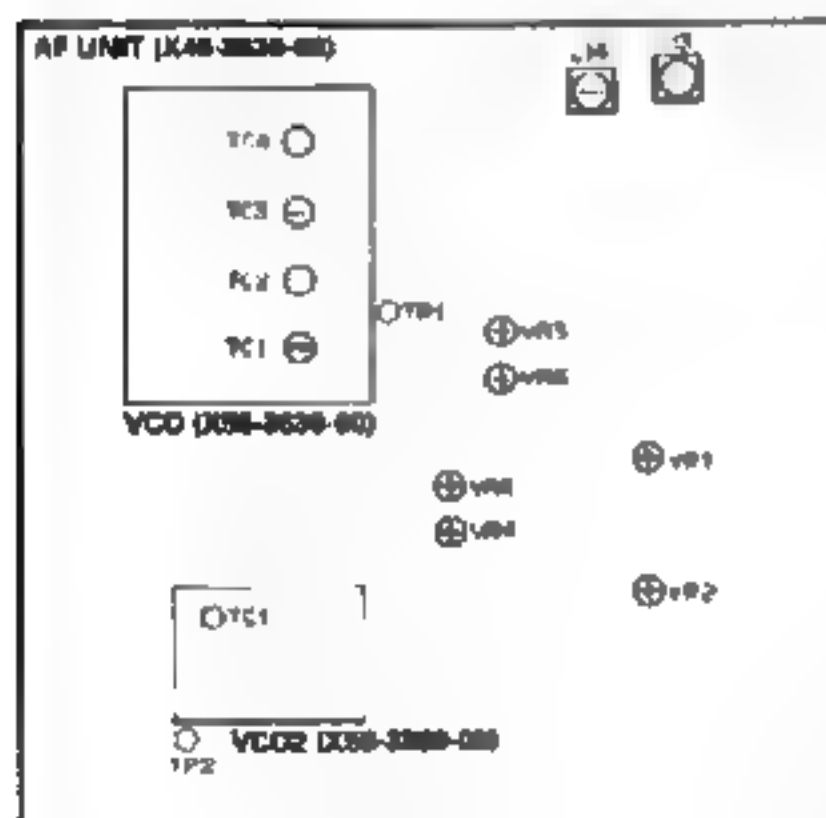
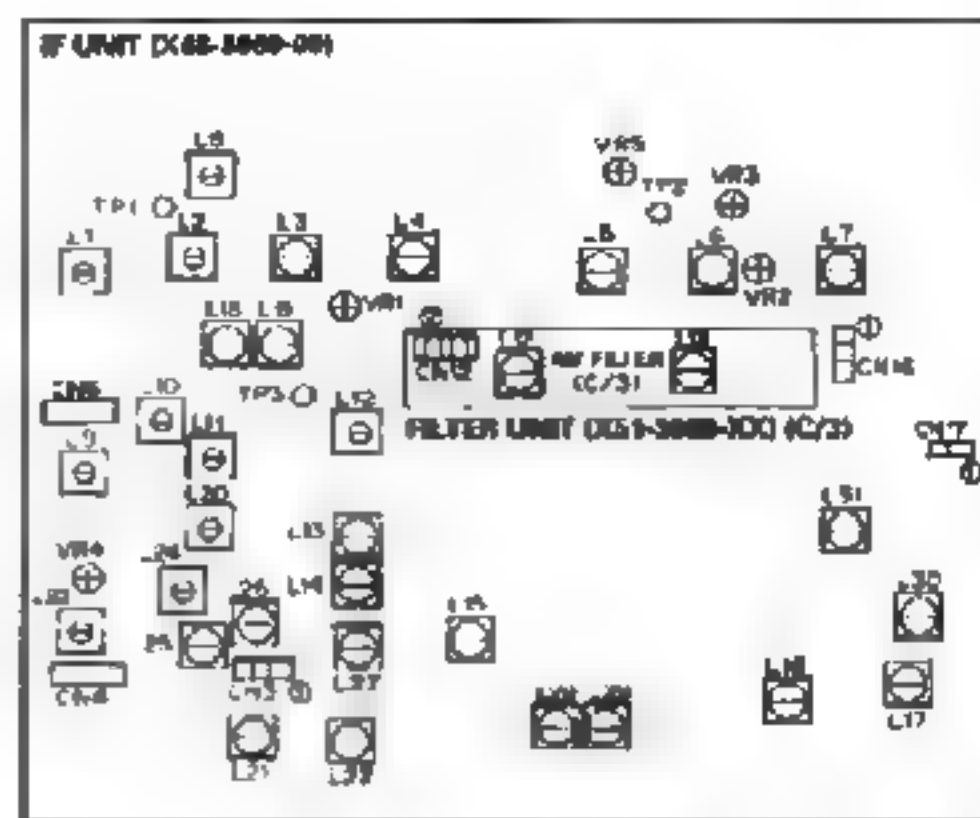
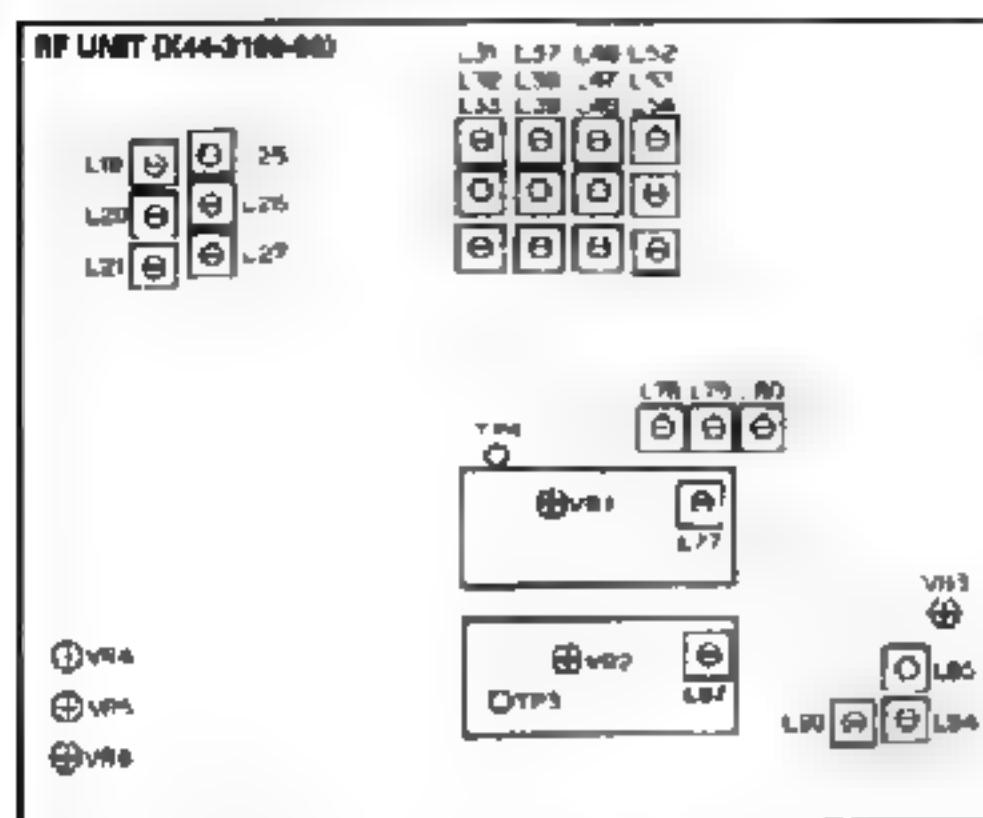
VR1 SCOPE SUB MARKER
VR2 CAR point (LSRA/LSB)
VR3 CAR point (LSB)
VR4 CAR point (USB)
VR5 CAR point

SWITCH UNIT (A) (K41-3088-000) (A/R)



ADJUSTMENT

Adjustment points (Lower side)



SWITCH UNIT (X41-3000-00) (K/10)
 VR7 Scope line LS8
 VR8 Scope line USB
 VR9 PITCH CW

SWITCH UNIT (X41-3000-00) (K/10)
 VR5 IF VBT (365.01d-c)

TERMINAL FUNCTION

| Connector No. | Terminal No. | Terminal Name | Terminal function |
|---------------------------------------|--------------|---------------|---|
| SWITCH UNIT (A) (X41-3080-001) | | | |
| CN1 (A/10) | 1 | LTXB | Transmitter LED signal Active "H" |
| | 2 | LMTA | AT-TUNE LED signal Active "H" |
| | 3 | LNOT | NOTCH LED signal Active "H" |
| | 4 | HIPC | AIP LED signal Active "L" |
| CN2 (A/10) | 1 | GND | GND |
| | 2 | MD | MIC down signal |
| | 3 | MU | MIC up signal |
| | 4 | K0 | Key output 0 SW ON "L" |
| | 5 | K1 | Key output 1 SW ON "L" |
| | 6 | K2 | Key output 2 SW ON "L" |
| | 7 | K3 | Key output 3 SW ON "L" |
| | 8 | K4 | Key output 4 SW ON "L" |
| | 9 | K5 | Key output 5 SW ON "L" |
| | 10 | K6 | Key output 6 SW ON "L" |
| | 11 | K7 | Key output 7 SW ON "L" |
| | 12 | S0 | Key matrix select signal 0 "L" Select |
| | 13 | S1 | Key matrix select signal 1 "L" Select |
| | 14 | S2 | Key matrix select signal 2 "L" Select |
| | 15 | S3 | Key matrix select signal 3 "L" Select |
| | 16 | S4 | Key matrix select signal 4 "L" Select |
| | 17 | S5 | Key matrix select signal 5 "L" Select |
| | 18 | S6 | Key matrix select signal 6 "L" Select |
| | 19 | NC | Not used |
| | 20 | GND | GND |
| CN3 (A/10) | 1 | MD | MIC down signal |
| | 2 | MU | MIC up signal |
| | 3 | NC | Not used |
| CN4 (A/10) | 1 | S6 | Key matrix select signal 6 |
| | 2 | K7 | Key output 7 |
| | 3 | K6 | Key output 6 |
| | 4 | K5 | Key output 5 |
| CN5 (A/10) | 1 | K0 | Key output 0 |
| | 2 | S5 | Key matrix select signal 5 |
| CN6 (A/10) | 1 | GND | GND |
| | 2 | LRB | Function RX-B LED signal input Active "H" |
| | 3 | LTB | Function TX-B LED signal input Active "H" |
| | 4 | LTM | Function TX-M LED signal input Active "H" |
| | 5 | LRA | Function RX-A LED signal input Active "H" |
| | 6 | LRM | Function RX-M LED signal input Active "H" |
| | 7 | LK1 | Key top LED signal input Active "H" |
| | 8 | LTA | Function TX-A LED signal input Active "H" |
| | 9 | LFSK | FSK LED signal input Active "H" |
| | 10 | LUSB | USB LED signal input Active "H" |
| | 11 | LUSB | USB LED signal input Active "H" |
| | 12 | LCW | CW LED signal input Active "H" |
| | 13 | LAM | AM LED signal input Active "H" |
| | 14 | NC | Not used |
| | 15 | NC | Not used |
| | 16 | LFM | FM LED signal input Active "H" |
| | 17 | TR | TX/RX identity signal output |
| | 18 | 5DIG | +5V |
| CN7 (B/10) | 1 | +15V | +15V |
| | 2 | VOX | VOX signal |
| | 3 | FULL | Full break-in signal |
| CN8 (B/10) | 1 | MONI | Monitor ON "H" |
| CN9 (B/10) | 1 | DIM2 | Dimmer signal input |
| | 2 | DIM1 | Dimmer signal output |

| Connector No. | Terminal No. | Terminal Name | Terminal function |
|---------------|--------------|---------------|--|
| CN10 (C/10) | 1 | SS | Standby signal "L" TX |
| | 2 | A1A | AT AUTO switch "L" AUTO |
| | 3 | A1S | AT start switch Active "H" |
| | 4 | GND | GND |
| CN11 (C/10) | 1 | ATS | AT switch Active "H" |
| | 2 | +15V | +15V input |
| | 3 | MONI | Monitor ON/OFF controlled output ON "H" |
| CN12 (H/10) | 1 | ANI | Audio signal (TX) Mic amplifier output |
| CN13 (H/10) | 1 | PCV | Gain variable voltage for power control |
| CN14 (H/10) | 1 | PKSS | Packet standby input Active "L" |
| | 2 | GND | GND |
| | 3 | PRCVH2 | Processor IN signal output |
| | 4 | GND | GND |
| | 5 | MICVR2 | Mic volume output signal output |
| | 6 | MICAO | Mic amplifier output signal output |
| | 7 | GND | GND |
| | 8 | GND | GND |
| | 9 | PRL2 | Processor OUT controlled voltage output |
| CN15 (H/10) | 1 | 8V | Microphone terminal +8V |
| | 2 | GND | GND |
| | 3 | SS | Standby signal "L" TX |
| | 4 | MG | MIC GND |
| | 5 | MIC | MIC signal |
| | 6 | MIC | MIC signal |
| CN16 (H/10) | 1 | DATC | DATA mode signal input "1" DATA mode |
| | 2 | POV3 | Power volume GND |
| | 3 | POV2 | Power volume output |
| | 4 | POV1 | Power volume input |
| | 5 | SS | Standby signal "L" TX |
| | 6 | GND | GND |
| | 7 | +8V | +8V |
| CN17 (E/10) | 1 | CWD | CW delay controlled voltage output |
| | 2 | +15V | +15V |
| | 3 | KSP2 | Electric lever speed controlled voltage input |
| | 4 | KSP1 | Electric lever speed controlled voltage output |
| CN18 (E/10) | 1 | GND | GND |
| | 2 | VOXVR2 | VOX gain controlled voltage output |
| | 3 | GND | GND |
| | 4 | AVH2 | ANTI VOX controlled voltage output |
| | 5 | VOXD | VOX delay controlled voltage output |
| | 6 | GND | GND |
| | 7 | MONVR2 | Monitor signal output |
| CN19 (E/10) | 1 | GND | GND |
| | 2 | MICAO | Mic amplifier output signal |
| CN20 (E/10) | 1 | GND | GND |
| | 2 | SP2 | AF signal (PHONE use) OFF |
| | 3 | GND | GND |
| | 4 | MICAO | Mic amplifier signal input |
| | 5 | GND | GND |
| | 6 | MONVR2 | Monitor signal input |
| CN21 (F/10) | 1 | GND | GND |
| CN22 (F/10) | 1 | K7 | Key output 7 input |
| | 2 | K6 | Key output 6 input |
| | 3 | K5 | Key output 5 input |
| | 4 | S6 | Key matrix select signal 6 input |
| CN23 (F/10) | 1 | AFTS | AF VBI switch "H" ON |
| | 2 | NOTS | NOTCH switch "H" ON |
| | 3 | NFM15 | +15V (Except FM mode) |

| Connector No. | Terminal No. | Terminal Name | Terminal function |
|---------------|--------------|---------------|-------------------|
| CN24 (G/10) | 1 | GND | GND |
| | 2 | GND | GND |
| CN25 (G/10) | 1 | GND | GND |
| | 2 | GND | GND |
| CN26 (G/10) | 1 | GND | GND |
| | 2 | GND | GND |
| CN27 (G/10) | 1 | GND | GND |
| | 2 | GND | GND |
| CN28 (G/10) | 1 | GND | GND |
| | 2 | GND | GND |
| CN29 (L/10) | 1 | GND | GND |
| | 2 | GND | GND |
| CN30 (L/10) | 1 | GND | GND |
| | 2 | GND | GND |
| CN31 (W/10) | 1 | GND | GND |
| | 2 | GND | GND |
| CN32 (W/10) | 1 | GND | GND |
| | 2 | GND | GND |
| CN33 (C/10) | 1 | GND | GND |
| | 2 | GND | GND |
| W1 (B/10) | 1 | GND | GND |
| | 2 | GND | GND |
| W2 (D/10) | 1 | GND | GND |
| | 2 | GND | GND |
| W3 (G/10) | 1 | GND | GND |
| | 2 | GND | GND |
| W4 (K/10) | 1 | GND | GND |
| | 2 | GND | GND |

TERMINAL FUNCTION

| Connector | Terminal | | Terminal function |
|----------------|----------|--------|--|
| No. | No. | Name | |
| CN24
(G/10) | 1 | +15 | +15V |
| CN25
(G/10) | 1 | SS8B | SS8 voltage supply (+15V) |
| | 2 | PRCSW | Processor switch: "H" ON |
| | 3 | GND | GND |
| | 4 | MPV | Mic volume signal/Processor IN signal. |
| | | | Processor switch ON Processor IN |
| | 5 | NB2 | Noise blanker 2 switch |
| | 6 | NB1 | Noise blanker 1 switch |
| | 7 | GND | GND |
| | 8 | +15 | +15V |
| CN26
(G/10) | 1 | GND | GND |
| | 2 | PRCVR2 | Processor IN sig. vol. |
| | 3 | GND | GND |
| | 4 | MICVR2 | Mic volume output signal |
| CN27
(G/10) | 1 | NBV2 | Main NB2 controlled voltage. |
| | 2 | SNBV2 | Sub NB2 controlled voltage. |
| | 3 | SNBV1 | Sub NB1 controlled voltage. |
| | 4 | NBV1 | Main NB1 controlled voltage. |
| | 5 | GND | GND |
| | 6 | +15 | +15V. |
| CN28
(G/10) | 1 | SNB2 | Sub NB2 switch |
| CN29
(G/10) | 2 | SNB1 | Sub NB1 switch |
| CN29
(W/10) | 1 | SDG | +5V. |
| | 2 | MNS | AT manual/auto switch: "L" - Auto |
| | 3 | GND | GND |
| | 4 | PR2 | AT VC2 preset data. |
| | 5 | PR1 | AT VC1 preset data. |
| | 6 | BI | Dimmer controlled signal. |
| | 7 | LI1 | Dimmer controlled signal. |
| CN30
(L/10) | 1 | GND | GND |
| | 2 | PRE1 | Preset data 1 |
| | 3 | PRE2 | Preset data 2 |
| | 4 | GND | GND |
| CN31
(L/10) | 1 | D-M2 | Dimmer signal output |
| | 2 | D-M1 | Dimmer signal input |
| CN32
(L/10) | 1 | CALS | Marker switch. |
| | 2 | GND | GND |
| | 3 | NC | Not used |
| | 4 | CV2 | CAR level volume |
| | 5 | CV1 | CAR level volume |
| CN33
(G/10) | 1 | MONI | Monitor ON - "H" |
| W1
(B/10) | 1 | MONI | Monitor ON - "H" |
| W2
(D/10) | 1 | VIC | MIL GND |
| | 2 | MIC | MIC signal. |
| | 3 | SS | Standby signal "L" TX |
| | 4 | GND | GND |
| | 5 | MD | MIC down signal. |
| | 6 | MU | MIC up signal. |
| | 7 | BM | MIC +5V |
| W3
(G/10) | 1 | KD | Key output 0: SW ON "L" |
| | 2 | SS | Key matrix select signal 5: " " Select |
| W4
(G/10) | 1 | SNBV1 | Sub NB1 controlled voltage |
| | 2 | NBV2 | Main NB2 controlled voltage. |
| | 3 | NBV1 | Main NB1 controlled voltage. |
| | 4 | GND | GND |
| | 5 | SNBV2 | Sub NB2 controlled voltage |
| | 6 | +15 | +15V |

| Connector | Terminal | | Terminal function |
|--------------------------------------|----------|---------|--|
| No. | No. | Name | |
| SWITCH UNIT (B) (X41-3090-00) | | | |
| CN1
(W/10) | 1 | SC1 | Squelch volume input except FM mode |
| | 2 | SC2 | Squelch volume output except FM mode |
| | 3 | FSQ2 | Squelch volume input with FM mode. |
| | 4 | FSQ1 | Squelch volume output with FM mode. |
| | 5 | GND | GND |
| | 6 | NOV2 | Notch volume output |
| | 7 | NOTS | Notch volume input. |
| CN2
(R/10) | 1 | SUBVR2 | Sub AF volume output. |
| | 2 | GND | GND |
| | 3 | SUBVR1 | Sub AF volume input |
| | 4 | GND | GND |
| CN3
(B/10) | 1 | PITVR | Reference voltage (Pitch) |
| | 2 | PIT | CW pitch volume. |
| | 3 | AGND | Analog GND |
| CN4
(C/10) | 1 | +15 | +15V |
| | 2 | ATT1 | 10dB ATT controlled signal |
| | 3 | ATT2 | 20dB ATT controlled signal |
| CN5
(D/10) | 1 | AGS | AGC select switch. |
| | 2 | MID | AGC time constant MID select signal. |
| | 3 | SLOW | AGC time constant SLOW select signal |
| | 4 | AGO | AGC OFF |
| CN6
(F/10) | 1 | REN2 | RIT encoder output 2 |
| | 2 | GND | GND |
| | 3 | REN1 | RIT encoder output 1 |
| CN7
(G/10) | 1 | GND | GND |
| | 2 | MAINVR2 | Main AF volume output. |
| | 3 | GND | GND |
| | 4 | MAINVR1 | Main AF volume input |
| CN8
(G/10) | 1 | RFB2 | RF GAIN volume output |
| | 2 | RFB1 | HF GAIN volume input |
| CN9
(H/10) | 1 | SP1 | Speaker 1 (AF signal hot side) |
| | 2 | GND | GND |
| | 3 | SP2 | AF signal. |
| | | | (Circuit will opened when PHONE plug is inserted.) |
| | 4 | GND | GND |
| | 5 | SP2 | AF signal. |
| | | | (Circuit will opened when PHONE plug is inserted.) |
| | 6 | GND | GND |
| CN10
(E/10) | 1 | GND | GND |
| | 2 | CFN1 | Click encoder output 1 |
| | 3 | CFN2 | Click encoder output 2 |
| CN11
(J/10) | 1 | AFVBT1 | AF VBT volume. |
| | 2 | AFVBT2 | AF VBT volume. |
| | 3 | NC | Not used |
| | 4 | AGND | Analog GND |
| | 5 | VBT | VBT volume |
| | 6 | VRE3 | Reference voltage 3 |
| CN12
(K/10) | 1 | SLL | Slope tune low cut volume. |
| | 2 | AGND | Analog GND |
| | 3 | SLH | Slope tune high cut volume |
| | 4 | VRE1 | Reference voltage 1 |
| | 5 | VRE2 | Reference voltage 2 |
| CN13
(K/10) | 1 | REF4 | Reference voltage 4 |
| | 2 | PITVR | Reference voltage (Pitch) |
| W1
(K/10) | 1 | GND | GND |

TERMINAL FUNCTION

| Connector | Terminal | | Terminal function |
|-------------------------------|----------|-------|---|
| No. | No. | Name | |
| AVR UNIT (X43-3070-01) | | | |
| CN1
(A/S) | 1 | FG2 | GND |
| | 2 | F15 | Final unit +15V output. |
| | 3 | F15 | Final unit +15V output. |
| CN2
(A/S) | 1 | +MT1 | Power supply fan (+). |
| | 2 | -MT1 | Power supply fan (-). |
| CN3
(A/S) | 1 | +MT2 | Transformer fan (+). |
| | 2 | -MT2 | Transformer fan (-). |
| CN4
(A/S) | 1 | 15SG | Signal unit +15V output. |
| | 2 | GND | GND |
| | 3 | -12SG | Signal unit -12V output. |
| CN5
(A/S) | 1 | TPT | Approx. 5V output when decrease a RF output (power down). |
| | 2 | GND | GND |
| | 3 | 15CN | Control unit +15V output. |
| | 4 | AF15 | Control unit +15V output (For AF amplifier μ PC2002). |
| | 5 | -12CN | Control unit -12V output. |
| CN6
(A/S) | 1 | 5PL | PLL unit +5V output. |
| | 2 | 15PL | PLL unit +15V output. |
| | 3 | GND | GND |
| | 4 | 5DG | Digital unit +5V output. |
| | 5 | GND | GND |
| | 6 | 5DS | Display unit +5V output. |
| | 7 | 15DS | Display unit +15V output. |
| | 8 | GND | GND |
| CN7
(D/S) | 1 | F | Display unit heater voltage input (FG GND AC 4.9V). |
| | 2 | FG | Display unit heater GND. |
| | 3 | F | Display unit heater voltage input (FG GND AC 4.9V). |
| CN8
(A/S) | 1 | 5DM | DSP unit +5V output. |
| | 2 | 5GND | GND |
| | 3 | 15DM | DSP unit +15V output. |
| | 4 | 15GND | GND |
| | 5 | -12DM | DSP unit -12V output. |
| | 6 | NC | GND |
| CN9
(L/S) | 1 | FG1 | Final unit GND. |
| | 2 | FG1 | Final unit GND. |
| | 3 | FHV | Final unit +55V output. |
| | 4 | FHV | Final unit +55V output. |
| CN10
(A/S) | 1 | GND | GND |
| | 2 | GND | GND |
| | 3 | CO | +15V power supply input. |
| | 4 | CO | +15V power supply input. |
| CN11
(B/S) | 1 | IV | Display unit -40V output. |
| | 2 | HG | GND |
| | 3 | NC | GND |
| CN12
(B/S) | 1 | GND | GND |
| | 2 | -12 | Each unit -12V output. |
| CN13
(B/S) | 1 | AC40 | -40V power supply input. |
| | 2 | AC40 | -40V power supply input. |
| | 3 | AC12 | -12V power supply input. |
| | 4 | AC12 | -12V power supply input. |
| CN14
(D/S) | 1 | F | Display unit heater voltage output (FG GND AC 4.9V). |
| | 2 | FG | Display unit heater GND. |
| | 3 | F | Display unit heater voltage output. (FG GND AC 4.9V). |

| Connector | Terminal | | Terminal function |
|---------------------------------|----------|-------|---|
| No. | No. | Name | |
| W1
(A/S) | 1 | GND | GND |
| | 2 | -12 | Each unit -12V input. |
| W2
(C/S) | | G | GND |
| | | G | GND |
| | | CO | +15V power supply output. |
| W3 (A/S) | | CO | +15V power supply output. |
| | | BB | +15V power supply bias input. |
| W4
(A/S) | 1 | S1 | Thermal switch + for power supply heat sink. |
| | 2 | S2 | Thermal switch - for power supply heat sink. |
| W5 (A/S) | 1 | SCRA | SCR unit (X58-3730-00) input. |
| (D/S) | | BB | +15V power supply bias output. |
| (B/S) | | ACL | Ac live (AC hot side). |
| (B/S) | | AC-N | AC neutral (AC GND side). |
| | | PWR/C | Power switch common. |
| (B/S) | | PWR-M | Power switch make. |
| (B/S) | | T-L | Power transformer live. |
| (B/S) | | T-N | Power transformer neutral. |
| RF UNIT (X44-3100-00) | | | |
| CN1 | | TIF | Transmit IF signal (73.05MHz). |
| CN2 | | MR | Marker signal. |
| | 2 | GND | Marker signal GND. |
| CN3 | | MYCO | Main LO1 input (73.08-103.05MHz). |
| CN4 | | SVCO | Sub LO1 input (40.055-70.055MHz). |
| CN5 | 1 | IF3 | Transmit BPF select signal (14.5-30MHz). |
| | 2 | TF2 | Transmit BPF select signal (7.5-14.5MHz). |
| | 3 | TF1 | Transmit BPF select signal (0.01-7.5MHz). |
| | 4 | GND | GND. |
| CN6 | | HIFC | AF advanced intercept Point controlled signal. |
| | 2 | RBD | Receive band information. |
| | 3 | RB1 | Receive band information. |
| | 4 | RB2 | Receive band information. |
| | 5 | RB3 | Receive band information. |
| | 6 | NC | Not used. |
| CN7 | | MIF | Main IF signal (73.05MHz). |
| CN8 | | DRV | Transmit drive output. |
| | | RAT | Receive antenna input. |
| CN9 | 1 | ATT1 | Active 10dB ATT level when receive ATT signal. |
| | 2 | ATT2 | Active 1.2dB ATT level when receive ATT signal. |
| | 3 | +15 | +15V. |
| | 4 | PCV | Gain variable voltage for power control. |
| CN10 | | SF | Sub IF signal. |
| W4 | 1 | GND | GND. |
| | 2 | MOS | +15V when monitor operates. |
| | 3 | ATS | +15V when AT TUNE operates. |
| | 4 | AGC | RF AGC control signal. |
| | 5 | TXB | +15V when transmit. |
| | 6 | +15 | +15V. |
| | 7 | RXB | +15V when receive. |
| FINAL UNIT (X45-3330-00) | | | |
| CN1 | 1 | FG1 | Final common. |
| | 2 | FG1 | Final common. |
| | 3 | FHV | +55V. |
| | 4 | FHV | +55V. |
| CN2 | 1 | FG2 | GND. |
| | 2 | F15 | +15V. |
| | 3 | F15 | +15V. |

TERMINAL FUNCTION

| Connector | Terminal | | Terminal function |
|-----------------------------------|----------|------|---|
| No. | No. | Name | |
| CN3 | 1 | TXI | Transmit stopped. |
| | 2 | TXB | +15V when transmit. |
| | 3 | IC- | IC meter (-L) |
| | 4 | IC+ | IC meter (+) |
| CN4 | 1 | NC | Not used. |
| | 2 | TXB | +15V when transmit. |
| | 3 | F15 | +15V |
| CN5 | 1 | MOT+ | Fan motor (+L) |
| | 2 | MOT- | Fan motor (-L) |
| CN6 | | DRV | Drive signal input. |
| | W1 | PO | Final output. |
| DIGITAL UNIT (X46-3050-XX) | | | |
| CN1 | 1 | SDG | +5V input. |
| | 2 | PRC | |
| | 3 | LTXB | Transmit LED signal input. |
| | 4 | ESS | Personal computer interface transmission request signal output. Active "H". |
| | 5 | TIO | Transmission disable signal output. |
| | 6 | CSS | Transmit/receive controlled signal input. "L": TX, "H": RX. |
| | 7 | NC | Not used. |
| | 8 | DATC | DATA mode signal output. "L": DATA mode. |
| | 9 | NC | Not used. |
| | 10 | NC | Not used. |
| | 11 | ALMS | METS select signal output. "L": ALC meter, "H": io meter. |
| | 12 | ATS | AT switch input. |
| | 13 | ATA | AT AUTO input. |
| | 14 | -12 | -12V input. |
| | 15 | +15 | +15V input. |
| | 16 | GND | GND. |
| | | | |
| CN2 | 1 | GND | |
| | 2 | PLE4 | PLL controlled data enable 4 output. |
| | 3 | PLE2 | PLL controlled data enable 2 output. |
| | 4 | PLE9 | PLL controlled data enable 9 output. |
| | 5 | PLE3 | PLL controlled data enable 3 output. |
| | 6 | PLE5 | PLL controlled data enable 5 output. |
| | 7 | PLE8 | PLL controlled data enable 8 output. |
| | 8 | PLE6 | PLL controlled data enable 6 output. |
| | 9 | PLE7 | PLL controlled data enable 7 output. |
| | 10 | NC | Not used. |
| | 11 | POA | PLL controlled data output. |
| | 12 | PCK | PLL controlled data clock output. |
| | 13 | MLE | DSP controlled data enable output (PLL). |
| | 14 | MEN | DSP controlled data enable output (DSP). |
| | 15 | MCK | DSP controlled data clock output (DSP PLL). |
| | 16 | MDA | DSP controlled data output (DSP PLL). |
| | 17 | UL2 | Unlock signal input. |
| | 18 | UL3 | Unlock signal input. |
| | 19 | FSKC | FSK mode signal output. "H": FSK mode. |
| | 20 | SEL1 | FSK controlled signal 1 output (shift width). |
| | 21 | SEL2 | FSK controlled signal 2 output (shift width). |
| | 22 | SEL3 | FSK controlled signal 3 output (shift direction). |
| | 23 | NC | Not used. |
| | 24 | GND | GND. |
| CN3 | 1 | GND | GND. |
| | 2 | SSBC | SSB mode signal output. "L": Mode select. |
| | 3 | FMC | FM mode signal output. "L": Mode select. |
| | 4 | CWC | CW mode signal output. "L": Mode select. |
| | 5 | AMC | AM mode signal output. "L": Mode select. |

| Connector | Terminal | | Terminal function |
|-----------|----------|------|--|
| No. | No. | Name | |
| | 6 | FSKC | FSK mode signal output. "L": Mode select. |
| | 7 | DATC | DATA mode signal output. "L": Mode select. |
| | 8 | DB | DSP mounted signal input. "H": Mounted. |
| | 9 | LN0T | NOTCH LED signal input. |
| | 10 | GND | GND. |
| | 11 | SD | Serial/parallel conversion IC data output. (TC9174F). |
| | 12 | STB | Serial/parallel conversion IC data enable output. (TC9174F). |
| | 13 | SCK | Serial/parallel conversion IC data clock output. (TC9174F). |
| | 14 | MOS | Transmit monitor switch input. "H": Monitor ON. |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| CN4 | 1 | GND | GND. |
| | 2 | NC | Not used. |
| | 3 | S6 | Key matrix select signal 6 output. "L": Select. |
| | 4 | S5 | Key matrix select signal 5 output. "L": Select. |
| | 5 | S4 | Key matrix select signal 4 output. "L": Select. |
| | 6 | S3 | Key matrix select signal 3 output. "L": Select. |
| | 7 | S2 | Key matrix select signal 2 output. "L": Select. |
| | 8 | S1 | Key matrix select signal 1 output. "L": Select. |
| | 9 | S0 | Key matrix select signal 0 output. "L": Select. |
| | 10 | K7 | Key input 7. "L": SW ON. |
| | 11 | K6 | Key input 6. "L": SW ON. |
| | 12 | K5 | Key input 5. "L": SW ON. |
| | 13 | K4 | Key input 4. "L": SW ON. |
| | 14 | K3 | Key input 3. "L": SW ON. |
| | 15 | K2 | Key input 2. "L": SW ON. |
| | 16 | K1 | Key input 1. "L": SW ON. |
| | 17 | K0 | Key input 0. "L": SW ON. |
| | 18 | MU | MIC up signal input. "L": SW ON. |
| | 19 | MD | MIC down signal input. "L": SW ON. |
| | 20 | GND | GND. |
| CN5 | 1 | GND | GND. |
| | 2 | DOT | FL tube and LED display data output. |
| | 3 | FCX | FL tube and LED display data clock output. |
| | 4 | FLE | FL tube and LED display data enable output. |
| | 5 | FBY | FL tube and LED display data busy input. "L": Busy. |
| | 6 | RES | Reset signal output. "L": Reset. |
| | 7 | SDG | +5V. |
| | 8 | LH | Dimmer controlled signal input (Latch). |
| | 9 | BI | Dimmer controlled signal output (Blanking). |
| | 10 | GND | GND. |
| CN6 | 1 | GND | GND. |
| | 2 | NC | Not used. |
| | 3 | VBD | PLL band information D output. VDD. |
| | 4 | VBC | PLL band information C output. VDD. |
| | 5 | VBB | PLL band information B output. select. |
| | 6 | VBA | PLL band information A output. of VDD. |
| | 7 | UL1 | Unlock signal input. |
| | 8 | PCK | PLL controlled data clock output. |
| | 9 | POA | PLL controlled data output. |
| | 10 | PLE1 | PLL controlled data enable 1 output. |
| | 11 | PLE0 | PLL controlled data enable 0 output. |
| | 12 | MABK | Main AF blanking output. "H": Blanking. |
| | 13 | SABK | Sub AF blanking output. "H": Blanking. |
| | 14 | GND | GND. |
| CN7 | 1 | SDG | +5V. |
| | 2 | EN1 | Main encoder pulse 1 input. 1 rotation. |
| | 3 | EN2 | Main encoder pulse 2 input. 250 pulse. |
| | 4 | GND | GND. |

TERMINAL FUNCTION

| Connector | Terminal | Terminal function |
|-----------|----------|-------------------|
| No. | No. | Name |
| CN8 | 1 | CEN1 |
| | 2 | CEN2 |
| | 3 | GND |
| | 4 | REN1 |
| | 5 | REN2 |
| | 6 | GND |
| CN9 | 1 | NC |
| | 2 | FXD |
| | 3 | TXD |
| | 4 | DGD |
| | 5 | CTS |
| | 6 | RTS |
| | 7 | NC |
| CN10 | 1 | MNS |
| | 2 | PR2 |
| | 3 | PR1 |
| | 4 | SDG |
| | 5 | GND |
| | 6 | GND |
| CN11 | 1 | -12 |
| | 2 | OK |
| | 3 | APRE |
| | 4 | VSAVR |
| | 5 | VREF |
| | 6 | AGND |
| | 7 | POD2 |
| | 8 | POD1 |
| CN12 | 1 | VRE3 |
| | 2 | VBT |
| | 3 | AGND |
| CN13 | 1 | VRE2 |
| | 2 | VRE1 |
| | 3 | SLL |
| | 4 | SLH |
| | 5 | AGND |
| CN14 | 1 | RWM |
| | 2 | MET3 |
| | 3 | MET1 |
| | 4 | PRM |
| | 5 | AGND |
| | 6 | AGND |
| CN15 | 1 | VRE4 |
| | 2 | PIT |
| | 3 | AGND |
| | 4 | NC |
| CN16 | 1 | BI |
| | 2 | LH |
| CN17 | 1 | GND |
| | 2 | RB3 |
| | 3 | RB2 |
| | 4 | RB1 |
| | 5 | RB0 |
| | 6 | HIPC |
| CN18 | 1 | GND |
| | 2 | LP3 |
| | 3 | LP2 |
| | 4 | LP1 |

| Connector | Terminal | Terminal function |
|-----------------------|----------|-------------------|
| No. | No. | Name |
| CN19 | 5 | LP0 |
| | 1 | LN0T |
| | 2 | LTXB |
| | 3 | LMTA |
| CN20 | 4 | HIPC |
| | 4 | HIPC |
| CN21 | 1 | SDG |
| | 2 | GND |
| CN22 | 1 | GND |
| | 2 | SRBK |
| | 3 | MRBK |
| CN23 | 1 | SDG |
| | 2 | SEN1 |
| | 3 | SEN2 |
| | 4 | GND |
| CN24 | 1 | SMG |
| | 2 | SMKR |
| | 3 | RG0 |
| | 4 | RG1 |
| | 5 | SMKC |
| | 6 | DGG |
| | 7 | NC |
| IF UNIT (X48-3000-00) | | |
| CN1 | 1 | BSFC |
| | 2 | BSFE |
| | 3 | BSFU |
| | 4 | BSFB |
| | 5 | BSFA |
| | 6 | MNG2 |
| | 7 | MNG1 |
| | 8 | PSQ |
| | 9 | STS |
| | 10 | NC |
| CN2 | 1 | SNB1 |
| | 2 | SNB2 |
| CN3 | 1 | ALC |
| | 2 | CKY |
| | 3 | GND |
| CN4 | | TIF |
| CN5 | | HG42 |
| CN6 | | MIF |
| CN7 | | SUBIF |
| CN8 | 1 | NB |
| | 2 | NBG |
| CN9 | 1 | H507 |
| | 2 | SP3 |
| CN10 | 1 | SRBK |
| | 2 | MRBK |
| CN11 | 1 | GND |
| | 2 | SP3 |
| | 3 | GND |
| | 4 | SP2 |
| CN12 | | PKSS |
| CN13 | 1 | JFO2 |
| | 2 | GND |
| CN14 | 1 | SP1 |
| | 2 | GND |
| | 3 | SS |
| | 4 | RAL |

TERMINAL FUNCTION

| Connector | Terminal | | Terminal function |
|------------------------------|----------|--------|-----------------------------------|
| No. | No. | Name | |
| | 5 | EKS | Electric key switch. |
| | 6 | COM | Paddle common. |
| | 7 | DOT | Paddle dot input. |
| | 8 | DASH | Paddle dash input. |
| | 9 | KSW | Key switch. |
| CN15 | 1 | SANO | Sub audio input. |
| | 2 | GND | GND |
| | 3 | MANO | Main audio input. |
| | 4 | GND | GND |
| | 5 | ANI | Rear panel MIC signal output. |
| | 6 | GND | GND |
| | 7 | SAF | Sub detection output. |
| | 8 | GND | GND |
| CN16 | 1 | C107 | Sub CAR input (10.695MHz). |
| | 2 | GND | GND |
| | 3 | GND | GND |
| CN17 | 1 | TR455 | TX/RX 455kHz IF IN/OUT. |
| | 2 | GND | GND |
| CN18 | 1 | GND | GND |
| | 2 | GND | GND |
| | 3 | H92B | Main LO3 input (9.825MHz). |
| W1 | 1 | GND | GND |
| | 2 | AGC | AGC voltage. |
| | 3 | NC | Not used. |
| | 4 | RXB | 15V when receive. |
| | 5 | TXB | 15V when transmit. |
| | 6 | -12 | -12V |
| | 7 | +15 | +15V |
| | 8 | SMET | Analog S-meter |
| AF UNIT (X49-3028-00) | | | |
| CN1 | 1 | MNG1 | NB1 gate controlled signal. |
| | 2 | MNG2 | NB2 gate controlled signal. |
| | 3 | SQ | Squelch signal. |
| | 4 | STS | Sidetone switch. |
| | 5 | RXB | +15V when receive. |
| | 6 | TXB | +15V when transmit. |
| | 7 | DB | DSP ON signal. |
| | 8 | FSKC | FSK mode controlled signal. |
| | 9 | CWC | CW mode controlled signal. |
| | 10 | FMC | FM mode controlled signal. |
| | 11 | SSBC | SSB mode controlled signal. |
| | 12 | FMNC | FM NARROW mode controlled signal. |
| | 13 | -12 | -12V. |
| | 14 | +15 | +15V. |
| CN2 | 1 | NB | Main NB signal output (8.83MHz). |
| | 2 | NBG | Main NB signal GND. |
| CN3 | 1 | GND | GND |
| | 2 | SANO | Sub audio output. |
| | 3 | GND | GND |
| | 4 | MANO | Main audio output. |
| | 5 | GND | GND |
| | 6 | SAF | Sub detection input. |
| CN4 | 1 | GND | GND |
| | 2 | DAF2 | DSP AF input. |
| | 3 | GND | GND |
| | 4 | DAF1 | DSP AF output. |
| CN5 | 1 | GND | GND |
| | 2 | AFVBT1 | AF VBT volume. |
| | 3 | AFVBT2 | AF VBT volume. |
| | 4 | GND | GND |

| Connector | Terminal | | Terminal function |
|-----------|----------|--------|--|
| No. | No. | Name | |
| CN6 | 1 | AFT | AF TUNE clock pulse (80kHz \pm 50kHz). |
| | 2 | GND | GND |
| CN7 | 1 | NB1 | Noise blanker 1 switch. |
| | 2 | NB2 | Noise blanker 2 switch. |
| | 3 | MON1 | Monitor switch. |
| | 4 | +15 | +15V. |
| | 5 | GND | GND |
| CN8 | 1 | MONR2 | Monitor signal input. |
| | 2 | GND | GND |
| | 3 | AVR2 | ANTI VOX controlled voltage input. |
| | 4 | GND | GND |
| | 5 | VOXD1 | VOX delay controlled voltage input. |
| | 6 | GND | GND |
| | 7 | VOXR2 | VOX GAIN controlled voltage input. |
| | 8 | GND | GND |
| CN9 | 1 | +15 | +15V. |
| | 2 | 15S | +15V switch. |
| CN10 | 1 | RBC | Receive timing controlled signal. |
| | 2 | VOXD | VOX delay signal. |
| | 3 | KEY | KEY signal. |
| | 4 | CWB | CW voltage supply +15V. |
| CN11 | 1 | AF | Audio signal output. |
| | 2 | GND | GND |
| | 3 | NC | Not used. |
| CN12 | 1 | GND | GND |
| | 2 | MICAD | MIC amplifier signal input. |
| | 3 | NC | Not used. |
| | 4 | MONR1 | Monitor signal output. |
| | 5 | GND | GND |
| CN13 | 1 | GND | GND |
| | 2 | MAINR2 | Main AF volume input. |
| | 3 | GND | GND |
| | 4 | SUBR2 | Sub AF volume input. |
| CN14 | 1 | NC | Not used. |
| | 2 | MAINR1 | Main AF volume output. |
| | 3 | NC | Not used. |
| | 4 | SUBR1 | Sub AF volume output. |
| CN15 | 1 | TON | Repeater tone input. |
| | 2 | GND | GND |
| CN16 | 1 | GND | GND |
| | 2 | SABK | Sub AF blanking input. |
| | 3 | MAK | Main AF blanking input. |
| | 4 | PLE0 | PLL controlled data enable 0 input. |
| | 5 | PLE1 | PLL controlled data enable 1 input. |
| | 6 | PDA | PLL controlled data input. |
| | 7 | PCK | PLL controlled data clock input. |
| | 8 | UL1 | Unlock detection signal output. |
| | 9 | VBA | PLL band information A. |
| | 10 | VBB | PLL band information B. |
| | 11 | VBC | PLL band information C. |
| | 12 | VBD | PLL band information D. |
| | 13 | NC | Not used. |
| | 14 | GND | GND |
| CN17 | 1 | VBD | VCO select signal (VCO7). |
| | 2 | VBC | VCO select signal (VCO7). |
| | 3 | VBB | VCO select signal (VCO7). |
| | 4 | VBA | VCO select signal (VCO7). |
| | 5 | GND | GND |
| CN18 | 1 | 10VCO | PLL reference signal (10MHz). |
| | 2 | GND | GND |

TERMINAL FUNCTION

| Connector | Terminal | | Terminal function |
|-------------------------------|----------|-------|--|
| No. | No. | Name | |
| CN19 | | HB42 | Main LO2 output (84.22MHz). |
| CN20 | | LO | PLL1 loop IF input (35.05~35.55MHz). |
| CN21 | | AFTSW | AF VBT ON/OFF controlled input. |
| W1 | 1 | GND | GND |
| | 2 | SCAF | Main SSB, CW AF input. |
| | 3 | GND | GND |
| | 4 | FAAF | Main FM, AM AF input. |
| | 5 | GND | GND |
| W2 | 1 | TF3 | Transmit BPF select signal (14.5~30MHz) |
| | 2 | TF2 | Transmit BPF select signal (7.5~14.5MHz) |
| | 3 | TF1 | Transmit BPF select signal (0.01~7.5MHz) |
| | 4 | GND | GND |
| W3 | | MYCO | Main LO1 output (73.05~103.05MHz). |
| PLL UNIT (X50-3100-00) | | | |
| CN1 | 1 | GND | GND |
| | 2 | NC | Not used. |
| | 3 | SEL3 | Keying pole (shift direction) select signal. |
| | 4 | SEL2 | Space frequency select signal. |
| | 5 | SEL1 | Space frequency select signal. |
| | 6 | FSKC | FSK mode controlled signal. |
| | 7 | UL3 | Unlock detection signal (Sub LO). |
| | 8 | UL2 | Unlock detection signal (Main LO, CAR). |
| | 9 | MDA | PLL, DSP data. |
| | 10 | MCK | PLL, DSP data clock. |
| | 11 | MEN | DSP command enable. |
| | 12 | MLE | PLL data enable (DSP). |
| | 13 | PCK | PLL data clock. |
| | 14 | PDA | PLL data. |
| | 15 | NC | Not used. |
| | 16 | PLE7 | PLL data enable (PLL7). |
| | 17 | PLE6 | PLL data enable (PLL6). |
| | 18 | PLE8 | PLL data enable (PLL8). |
| | 19 | PLE5 | PLL data enable (PLL5). |
| | 20 | PLE9 | PLL data enable (PLL9). |
| | 21 | PLE3 | PLL data enable (PLL3). |
| | 22 | PLE2 | PLL data enable (PLL2). |
| | 23 | PLE4 | PLL data enable (PLL4). |
| | 24 | GND | GND |
| CN2 | 1 | VBD | VCO select signal (VCO7). |
| | 2 | VBC | VCO select signal (VCO7). |
| | 3 | VBB | VCO select signal (VCO7). |
| | 4 | VBA | VCO select signal (VCO7). |
| | 5 | GND | GND |
| CN3 | 1 | PDA | PLL data. |
| | 2 | PCK | PLL data clock. |
| | 3 | PLE8 | PLL data enable (PLL8). |
| | 4 | PLE5 | PLL data enable (PLL5). |
| | 5 | PLE9 | PLL data enable (PLL9). |
| | 6 | PLE4 | PLL data enable (PLL4). |
| | 7 | UL4 | Unlock detection signal. |
| CN4 | 1 | MDA | PLL, DSP data. |
| | 2 | MCK | PLL, DSP data clock. |
| | 3 | MEN | DSP command enable. |
| | 4 | MLE | PLL data enable (DSP). |
| | 5 | GND | GND |
| CN5 | 1 | 15PL | +15V. |
| | 2 | 5PL | +5V. |
| | 3 | GND | GND |
| CN6 | 1 | GND | GND |
| | 2 | 5PL | +5V. |

| Connector | Terminal | | Terminal function |
|-------------------------------|----------|-------|--|
| No. | No. | Name | |
| | 3 | 15PL | +15V. |
| | 4 | 5PL | +5V. |
| CN7 | | LO | PLL [*] loop IF output (35.05~35.55MHz) |
| CN8 | | SVCO | Sub LO1 output (40.085~70.055MHz) |
| CN9 | | H507 | Sub LO2 output (50.75MHz) |
| W1 | 1 | FSKC | FSK mode controlled signal. |
| | 2 | SEL1 | Space frequency select signal. |
| | 3 | SEL2 | Space frequency select signal. |
| | 4 | SEL3 | Keying pole (shift direction) select signal. |
| W2 | | 20M | Reference signal (20MHz) |
| CAR UNIT (X50-3110-XX) | | | |
| CN1 | 1 | C355 | Main LO4 output (355kHz). |
| | 2 | GND | GND |
| | 3 | H828 | Main LO3 output (9.285MHz) |
| | 4 | GND | GND |
| CN2 | 1 | AFT | AF TUNE clock (80kHz ± 50kHz) |
| | 2 | GND | GND |
| CN3 | 1 | C107 | Sub CAR output (10.7MHz) |
| | 2 | GND | GND |
| | 3 | C100 | Main CAR output (100kHz). |
| | 4 | GND | GND |
| CN4 | 1 | 10M | PLL reference signal (10MHz) |
| | 2 | GND | GND |
| | 3 | NC | Not used. |
| CN5 | 1 | 10VCO | PLL reference signal (10MHz). |
| | 2 | GND | GND |
| CN6 | 1 | FSKC | FSK mode controlled signal. |
| | 2 | SEL1 | Space frequency select signal. |
| | 3 | SEL2 | Space frequency select signal. |
| | 4 | SEL3 | Keying pole (shift direction) select signal. |
| CN7 | 1 | AFSK | FSK mark, space signal. |
| | 2 | GND | GND |
| | 3 | NC | Not used. |
| CN8 | 1 | RTTY | FSK KEY |
| | 2 | GND | GND |
| CN9 | 1 | CALS | MKR switch. |
| | 2 | GND | GND |
| CN10 | | 20M | Reference signal (20MHz) |
| CN11 | 1 | MKR | MKR signal (800kHz) |
| | 2 | NC | Not used. |
| CN12 | 1 | DGG | Digital GND |
| | 2 | SMKC | Sub marker control. |
| | 3 | RG1 | Monitor scope SPAN switch. |
| | 4 | RG0 | Monitor scope SPAN switch. |
| | 5 | SMKR | Sub marker voltage. |
| | 6 | SMG | Analog GND |
| CN13 | 1 | GND | GND |
| | 2 | RTS | Transmit request output. |
| | 3 | CTS | Transmit possible input. |
| | 4 | DGG | Signal GND |
| | 5 | TXD | Transmit data output. |
| | 6 | RXD | Receive data input. |
| | 7 | GND | GND |
| W1 | 1 | PDA | PLL data. |
| | 2 | PCK | PLL data clock. |
| | 3 | PLE6 | PLL data enable (PLL6). |
| | 4 | PLE5 | PLL data enable (PLL5). |
| | 5 | PLE9 | PLL data enable (PLL9). |
| | 6 | PLE4 | PLL data enable (PLL4). |

TERMINAL FUNCTION

| Connector | Terminal | | Terminal function |
|-----------------------------------|----------|---------|--|
| No. | No. | Name | |
| | 7 | UL4 | Unlock detection signal |
| W2 | 1 | GND | GND |
| | 2 | 5PL | +5V |
| | 3 | 15PL | +15V |
| | 4 | 8PL | +8V |
| J1 | | EXT STD | External reference input (10kHz, 1Vp-p/500Ω) |
| J2 | | RKEY | FSK KEY |
| J3 | 1 | SMG | Analog GND |
| | 2 | SMKC | Sub marker control |
| | 3 | HG1 | Monitor scope SAPH switch |
| | 4 | NC | Not used. |
| | 5 | PGO | Monitor scope SPAN switch |
| | 6 | NC | Not used. |
| | 7 | SMKR | Sub marker voltage. |
| | 8 | DGG | Digital GND |
| J4 | 1 | GND | GND |
| | 2 | TXD | Transmit data output. |
| | 3 | RXD | Receive data input. |
| | 4 | CTS | Transmit possible input |
| | 5 | RTS | Transmit request output. |
| | 6 | NC | Not used. |
| FILTER UNIT (X51-3060-XX) | | | |
| CN1 | | AT1 | AT input. |
| CN2 | | AT2 | AT output. |
| CN3 | 1 | RANT | Receive antenna |
| | 2 | GND | GND |
| CN4 | | PO | Fiber input |
| CN5 | 1 | GND | GND |
| | 2 | F15 | +15V |
| | 3 | F5 | +5V |
| CN6 | 1 | VSR | Reflector detection. |
| | 2 | GND | GND |
| | 3 | GND | GND |
| | 4 | VSF | Forward detection. |
| | 5 | PO | Power output drop. |
| CN7 | 1 | 10A | 7.5-10.5MHz |
| | 2 | 25A | 21.5-24.5MHz |
| | 3 | 28A | 24.5-30MHz |
| | 4 | 7A | 4-7.5MHz |
| | 5 | 18A | 14.5-18.5MHz |
| | 6 | 21A | 18.5-21.5MHz |
| | 7 | 4A | 2.5-4MHz |
| | 8 | 14A | 10.5-14.5MHz |
| | 9 | NC | Not used. |
| | 10 | GND | GND |
| CN8 | 1 | LP0 | Filter select. |
| | 2 | LP1 | Filter select. |
| | 3 | LP2 | Filter select. |
| | 4 | LP3 | Filter select. |
| | 5 | GND | GND |
| W23 | 1 | F15 | +15V |
| | 2 | TXB | +15V when transmit. |
| CONTROL UNIT (X53-3230-00) | | | |
| CN1 (A/3) | 1 | GND | GND |
| | 2 | GND | GND |
| | 3 | BZ | Beep level input. |
| CN2 (A/3) | 1 | GND | GND |
| | 2 | VO | Voice synthesizer signal |

| Connector | Terminal | | Terminal function |
|------------|----------|-------|--|
| No. | No. | Name | |
| CN3 (A/3) | 1 | GND | GND |
| | 2 | AF | Audio signal input. |
| CN4 (A/3) | 1 | NC | Not used. |
| | 2 | CWB | CW mode voltage supply |
| | 3 | VOXD | VOX DELAY signal |
| CN5 (A/3) | 1 | KEY | KEY signal. |
| | 2 | RBC | Receive timing controlled signal |
| CN6 (A/3) | 1 | SP1 | AF signal output |
| | 2 | GND | GND |
| CN7 (A/3) | 1 | TPT | Temperature power down voltage +5V |
| | 2 | -12CN | -12V for control unit. |
| | 3 | 16CN | +15V for control unit. |
| | 4 | AF15 | Voltage supply +15V for audio amplifier. |
| | 5 | GND | GND |
| CN8 (A/3) | 1 | ATS | AT switch. |
| | 2 | ATA | AT AUTO switch. |
| | 3 | FULL | Full break-in signal. |
| | 4 | VOX | VOX signal. |
| | 5 | SS | Stand-by switch. |
| | 6 | GND | GND |
| | 7 | +15 | +15V. |
| CN9 (A/3) | 1 | NC | Not used. |
| | 2 | DATC | Data controlled signal |
| | 3 | SS | Stand-by switch. |
| CN10 (A/3) | 1 | GND | GND |
| | 2 | SP1 | Audio signal. |
| | 3 | CKY | Keying control. |
| | 4 | SS | Stand-by switch. |
| | 5 | ALC | ALC signal. |
| CN11 (A/3) | 1 | KSW | Key switch. |
| | 2 | RAL | External ALC input. |
| | 3 | EKS | Electric key switch. |
| CN12 (A/3) | 1 | KSP2 | Electric keyer speed. |
| | 2 | KSP1 | Electric keyer speed. |
| | 3 | CWD | CW delay. |
| | 4 | +15 | +15V |
| CN13 (A/3) | 1 | TXB | Voltage supply for transmit (+15V). |
| | 2 | CKY | Keying controlled signal |
| | 3 | NC | Not used. |
| CN14 (A/3) | 1 | AGO | AGC OFF |
| | 2 | SLOW | AGC time constant SLOW select signal. |
| | 3 | MID | AGC time constant MID select signal |
| | 4 | AGS | AGC switch. |
| CN15 (A/3) | 1 | TXB | Voltage supply for transmit (+15V). |
| | 2 | TXI | Transmit stop signal. |
| | 3 | IC- | Collector current (-) signal. |
| | 4 | IC+ | Collector current (+) signal. |
| CN16 (A/3) | 1 | NC | Not used. |
| | 2 | NC | Not used. |
| | 3 | ATA | AT AUTO switch. |
| | 4 | ATS | AT switch. |
| | 5 | NC | Not used. |
| CN17 (A/3) | 1 | GND | GND |
| | 2 | VSR | Reflector voltage. |
| CN18 (A/3) | 1 | AGND | GND |
| | 2 | AGND | GND |
| | 3 | PRM | Processor meter |
| | 4 | MET1 | Meter signal input. |
| | 5 | MET3 | Meter signal. |
| | 6 | RWM | SWR meter signal. |

TERMINAL FUNCTION

| Connector | Terminal | | Terminal function |
|---------------|----------|-------|---|
| No. | No. | Name | |
| CN19
(A/3) | 1 | GND | GND |
| | 2 | +15 | +15V |
| | 3 | -12 | -12V |
| | 4 | ATA | AT AUTO switch |
| | 5 | ATS | AT switch |
| | 6 | ALMS | ALC meter switch |
| | 7 | NC | Not used. |
| | 8 | NC | Not used. |
| | 9 | DATC | Data controlled signal. |
| | 10 | NC | Not used. |
| | 11 | CSS | Stand-by controlled signal. |
| | 12 | TXI | Transmit stop signal. |
| | 13 | ESS | Personal computer interface STBY switch. |
| | 14 | LTXB | ON AIR LED signal. |
| | 15 | PRDC | |
| | 16 | SDIG | +5V voltage supply for digital unit |
| CN20
(A/3) | 1 | RXB | Receive voltage supply +15V |
| | 2 | TXB | Transmit voltage supply +15V. |
| | 3 | RBC | Receive timing controlled signal |
| | 4 | PRS | Processor switch |
| | 5 | AGS | AGC switch |
| | 6 | MID | AGC time constant MID select signal |
| | 7 | SLOW | AGC time constant SLOW select signal. |
| | 8 | AGO | AGC OFF |
| | 9 | SSBB | SSB mode voltage supply (+15V). |
| | 10 | PRM1 | Processor meter signal input. |
| | 11 | GND | GND |
| | 12 | SMET | S-meter signal. |
| | 13 | NC | Not used. |
| | 14 | D15 | +15V supply when connect to DSP-10. |
| CN21
(A/3) | 1 | 8V | +8V. |
| | 2 | ALCC | ALC signal connection |
| | 3 | -12 | -12V |
| | 4 | GND | GND |
| CN22
(A/3) | 1 | NC | Not used. |
| | 2 | MET1 | Meter signal input. |
| | 3 | TPT | Temperature power down voltage +5V |
| | 4 | ATS | AT switch. |
| | 5 | +15 | +15V |
| | 6 | GND | GND |
| CN23
(A/3) | 1 | SSBB | SSB mode voltage supply (+15V). |
| | 2 | PRCSW | Processor switch. |
| CN24
(B/3) | 1 | PD | Power output drop signal |
| | 2 | GND | GND |
| | 3 | VSF | Forward voltage |
| CN25
(B/3) | 1 | GND | GND |
| | 2 | 8V | +8V |
| | 3 | POV3 | Power output volume GND |
| | 4 | POV2 | Power output volume output |
| CN26
(C/3) | 1 | COM | Paddle input common. |
| | 2 | DASH | Paddle dash input. |
| | 3 | DOT | Paddle dot input. |
| CN27
(C/3) | 1 | EKS | Electric keyer switch. |
| | 2 | KEY | Key signal (Key down : 0V, Key up : 15V). |
| | 3 | FULL | Full break-in signal. |
| | 4 | CWB | CW mode voltage supply. |
| | 5 | +5 | +5V |
| | 6 | GND | GND |
| CN28
(A/3) | 1 | EKS | Electric key switch. |
| | 2 | KEY | Key signal (Key down : 0V, Key up : 15V). |

| Connector | Terminal | | Terminal function |
|------------------------------|----------|---------------------|---|
| No. | No. | Name | |
| | 3 | FULL | Full break-in signal. |
| | 4 | CWB | CW mode voltage supply. |
| | 5 | +5 | +5V |
| | 6 | GND | GND |
| CN29
(A/3) | 1 | NC | Not used. |
| | 2 | KSP1 | Electric keyer speed. |
| | 3 | KSP2 | Electric keyer speed. |
| CN30
(C/3) | 1 | NC | Not used. |
| | 2 | KSP1 | Electric keyer speed. |
| | 3 | KSP2 | Electric keyer speed. |
| CN31
(C/3) | 1 | GND | GND |
| | 2 | AUTO | AUTO waiting. |
| | 3 | REV | Reverse. |
| | 4 | WT1 | Waiting (Manual setting 1). |
| | 5 | WT0 | Waiting (Manual setting 0). |
| CN32
(C/3) | | KEY | Key signal (Key down : 0V, Key up : 15V). |
| | | KEY | Key signal (Key down : 0V, Key up : 15V). |
| W3
(A/3) | 1 | GND | GND |
| | 2 | AUTO | AUTO waiting |
| | 3 | REV | Reverse |
| | 4 | WT1 | Waiting (Manual setting 1). |
| | 5 | WT0 | Waiting (Manual setting 0). |
| W4
(B/3) | 1 | 8V | +8V |
| | 2 | ALCC | ALC signal connection. |
| | 3 | -12 | -12V |
| | 4 | GND | GND |
| W5
(B/3) | 1 | NC | Not used |
| | 2 | MET1 | Meter signal. |
| | 3 | ATS | AT switch |
| | 4 | TPT | Temperature power down voltage +5V. |
| | 5 | GND | GND |
| | 6 | +15 | +15V |
| AT UNIT (X53-3240-00) | | | |
| CN1 | AT1 | AT input terminal | |
| CN2 | AT2 | AT output terminal. | |
| CN3 | 1 | VRF | +5V reference |
| | 2 | POD2 | Volume 2 output. |
| | 3 | GND | GND |
| | 4 | POD1 | Volume 1 output |
| CN4 | 1 | NC | Not used. |
| | 2 | M2- | Motor 2 drive (-). |
| | 3 | M2+ | Motor 2 drive (+) |
| | 4 | M1 | Motor 1 drive (-) |
| | 5 | M1+ | Motor 1 drive (+) |
| CN5 | 1 | F5 | +5V |
| | 2 | F15 | +15V |
| | 3 | GND | GND |
| CN101 | 1 | 28A | 24.5-30MHz. |
| | 2 | 25A | 21.5-24.5MHz |
| | 3 | 21A | 18.5-21.5MHz |
| | 4 | 18A | 14.5-18.5MHz |
| | 5 | 14A | 10.5-14.5MHz |
| | 6 | 10A | 7.5-10.5MHz |
| | 7 | 7A | 4-7MHz. |
| | 8 | 4A | 2.5-4MHz |
| | 9 | GND | GND |
| W1 | | VC1 | VC1 hot side. |

AT coil tap
band information

TERMINAL FUNCTION

| Connector | No. | Terminal Name | Terminal function |
|-------------------------------|-----|---------------|---|
| W2 | | VC2 | VC2 hot side |
| W3 | | GND | GND |
| W4 | 1 | OK | "H" when tuning. |
| | 2 | VSWR | VSWR |
| | 3 | APRE | "L" when auto tuning. |
| | 4 | VRE | +5V reference. |
| | 5 | PRE1 | Preset data 1 |
| | 6 | PRE2 | Preset data 2 |
| | 7 | POD2 | Position 2 |
| | 8 | GND | GND |
| | 9 | GND | GND |
| | 10 | POD1 | Position 1 |
| | 11 | GND | Analog GND for digital unit. |
| W5 | 1 | ATA | AT AUTO switch. |
| | 2 | ATS | AT switch. |
| W101 | | VC | VC1, VC2 common side. |
| W102 | | GND | GND |
| DSP UNIT (X53-3260-00) | | | |
| CN* | 1 | GND | GND |
| | 2 | DMIC | MIC input. |
| | 3 | DAF1 | Audio input. |
| | 4 | DAF2 | Audio output. |
| | 5 | GND | GND |
| | 6 | GND | GND |
| | 7 | DB | -15V |
| | 8 | D455 | 455kHz output. |
| CN2 | 1 | -12 | -12V |
| | 2 | GND | GND |
| | 3 | GND | GND |
| | 4 | +15 | +15V |
| CN3 | 1 | 10M | 10MHz reference. |
| | 2 | GND | GND |
| CN4 | 1 | GND | GND |
| | 2 | MIX | MIX |
| | 3 | GND | GND |
| | 4 | SH | Sample hold amplifier, sampling timing. |
| | 5 | LEC | D/A convert command |
| | 6 | CC | A/D convert command |
| | 7 | GND | GND |
| | 8 | ADD1 | Data from A/D converter |
| | 9 | CK17 | Serial clock |
| | 10 | DADT | Data to D/A converter |
| | 11 | GND | GND |
| | 12 | ANSW | D/A converter output duty adjust |
| | 13 | MOD2 | LPF input mute |
| | 14 | MOD0 | DMIC-DAF1 select, DAF1-DAF2 through. |
| | 15 | MOD1 | ATT control. |
| | 16 | +15A | +15V |
| | 17 | +15A | +15V |
| | 18 | HPF1 | HPF control. |
| | 19 | HPF2 | HPF control |
| | 20 | GND | GND |
| CN6 | 1 | GND | GND |
| | 2 | HPF2 | HPF control. |
| | 3 | HPF1 | HPF control. |
| | 4 | +15A | +15V |
| | 5 | +15A | +15V |
| | 6 | MOD1 | ATT control |
| | 7 | MOD0 | DMIC-DAF1 select, DAF1-DAF2 through. |
| | 8 | MOD2 | LPF input mute. |
| | 9 | ANSW | D/A converter output duty adjust. |

| Connector | No. | Terminal Name | Terminal function |
|-----------|-----|---------------|---|
| | 10 | GND | GND |
| | 11 | DADT | Data to D/A converter |
| | 12 | CK17 | Serial clock. |
| | 13 | ADD1 | Data from A/D converter |
| | 14 | GND | GND |
| | 15 | CC | A/D convert command |
| | 16 | LEC | D/A convert command. |
| | 17 | SH | Sample hold amplifier, sampling timing. |
| | 18 | GND | GND |
| | 19 | MIX | MIX |
| | 20 | GND | GND |
| CN6 | 1 | GND | GND |
| | 2 | 5DMS | +5V voltage supply for digital section. |
| | 3 | MLE | PLL data enable. |
| | 4 | MEN | DSP command enable. |
| | 5 | MCK | PLL DSP data clock. |
| | 6 | MDA | PLL DSP data |
| | 7 | RTTY | FSK KEY |
| | 8 | CKY | CW KEY |
| | 9 | TXB | TX +15V. |
| CN7 | 1 | GND | GND |
| | 2 | CLK | Reference signal |
| | 3 | GND | GND |
| | 4 | +5 | +5V |
| | 5 | MCK2 | PLL data clock |
| | 6 | MLE2 | PLL data enable |
| | 7 | MDA2 | PLL data |
| | 8 | +15D | +15V |
| W1 | 1 | +15B | +15V |
| | 2 | MDA2 | PLL data. |
| | 3 | MLE2 | PLL data enable |
| | 4 | MCK2 | PLL data clock |
| | 5 | +5 | +5V |
| | 6 | GND | GND |
| | 7 | CLK | Reference signal |
| | 8 | GND | GND |
| DSPA | 1 | GND | GND |
| | 2 | 5DMS | +5V voltage supply for digital section |
| | 3 | MLE | PLL data enable. |
| | 4 | MEN | DSP command enable. |
| | 5 | MCK | PLL DSP data clock |
| | 6 | MDA | PLL DSP data |
| | 7 | RTTY | FSK KEY |
| | 8 | CKY | CW KEY |
| | 9 | TXB | TX +15V |
| | 10 | NC | Not used. |
| | 11 | -12 | -12V voltage supply for analog section. |
| | 12 | GND | GND |
| | 13 | GND | GND |
| | 14 | +15 | +15V voltage supply for analog section |
| | 15 | 10DMS | Reference |
| | 16 | GND | 10DMS GND |
| | 17 | NC | Not used. |
| | 18 | NC | Not used. |
| DSPB | 1 | GND | GND |
| | 2 | DMIC | MIC input |
| | 3 | DAF1 | Audio input. |
| | 4 | DAF2 | Audio output. |
| | 5 | GND | GND |
| | 6 | GND | GND |
| | 7 | D456 | 455kHz IF output. |
| | 8 | DB | Analog-DSP select signal. |

TERMINAL FUNCTION

| Connector | Terminal | Terminal Function |
|-----------------------------------|----------|---|
| No. | No. Name | |
| DISPLAY UNIT (X14-3300-00) | | |
| CN1 | 1 | 6DG +5V voltage supply for keyboard (+5V). |
| | 2 | TR TX/RX signal input |
| | 3 | LFM FM mode LED output. Active "H" |
| | 4 | NC Not used. |
| | 5 | NC Not used. |
| | 6 | LAM AM mode LED output. Active "H" |
| | 7 | LCW CW mode LED output. Active "H" |
| | 8 | LUSB USB mode LED output. Active "H" |
| | 9 | LLSB LSB mode LED output. Active "H" |
| | 10 | LFSK FSK mode LED output. Active "H" |
| | 11 | LTA Function TX-A LED output. Active "H" |
| | 12 | LK1 Key tap LED output. Active "H" |
| | 13 | LPM Function RX-M LED output. Active "H" |
| | 14 | LRA Function RX-A LED output. Active "H" |
| | 15 | LTM Function TX-M LED output. Active "H" |
| | 16 | LTB Function TX-B LED output. Active "H" |
| | 17 | LRB Function RX-B LED output. Active "H" |
| | 18 | GND GND |
| CN2 | 1 | TN1 87.0-250.3Hz repeater tone output |
| | 2 | GND GND |
| CN3 | 1 | TN2 1750Hz repeater tone output |
| | 2 | GND GND |
| CN4 | 1 | BZ Beep level output. |
| | 2 | GND GND |
| CN5 | 1 | GND GND |
| | 2 | BI Dimmer blanking signal input. |
| | 3 | LH Dimmer controlled output |
| | 4 | BUG +5V voltage supply input |
| | 5 | RES Reset signal input. "L": Reset |
| | 6 | FBY Serial busy output. "L": Busy |
| | 7 | FLE Serial enable input. |
| | 8 | FCK Serial clock input. |
| | 9 | FDT Serial data input. |
| | 10 | GND GND |
| CN6 | 1 | F FL tube filament power supply input. Between F to F. Approx. AC 9.6V |
| | 2 | FG FL tube filament power supply output. Center tap DC bias. Approx. -28V |
| | 3 | F FL tube filament power supply input. Between F to F. Approx. AC 9.6V |
| | 4 | HFV FL tube drive voltage supply input (approx. 45V). |
| | 5 | HG FL tube drive voltage supply GND |
| | 6 | 15DS FL tube drive voltage supply input (+15V). |
| | 7 | GND GND |
| | 8 | SDS FL tube drive voltage supply input (+5V) |
| CN7 | 1 | SC Voltage supply output for option VS-2 |
| | 2 | SD Serial data output for option VS-2 |
| | 3 | SCK Serial clock output for option VS-2 |
| | 4 | BSY Busy input for option VS-2 |
| | 5 | STR Start signal output for option VS-2 |
| | 6 | GND GND |
| SIGNAL UNIT (X57-3380-00) | | |
| CN1 | 1 | RXB +15V when receive. |
| | 2 | TXB +15V when transmit |
| | 3 | RBC Receive timing signal. |
| | 4 | PRS Processor switch. |
| | 5 | AGS +15V except data mode. |
| | 6 | MID AGC time constant MID select signal. |
| | 7 | SLOW AGC time constant SLOW select signal. |
| | 8 | AGO AGC OFF signal. |

| Connector | Terminal | Terminal Function |
|-----------|----------|---|
| No. | No. Name | |
| CN2 | 9 | SSBB +15V when SSB mode. |
| | 10 | PRM1 Compression meter voltage output. |
| | 11 | GND GND |
| | 12 | SMET S-meter voltage output. |
| | 13 | NC Not used. |
| | 14 | D15 +15V voltage supply output for DSP-10 |
| | 1 | MOS Monitor switch |
| | 2 | CK TC9174F clock signal. |
| | 3 | STB TC9174F strobe signal. |
| | 4 | SD TC9174F data signal. |
| | 5 | GND GND |
| | 6 | LNOT NOTCH LED voltage |
| | 7 | DB On signal for DSP-10 |
| | 8 | DATAC Data mode controlled signal |
| | 9 | FSKC FSK mode controlled signal |
| CN3 | 10 | AMC AM mode controlled signal |
| | 11 | CWC CW mode controlled signal |
| | 12 | FMC FM mode controlled signal |
| | 13 | SSBC SSB mode controlled signal |
| | 14 | GND GND |
| CN3 | 1 | AESK1 A-SK signal |
| | 2 | GND GND |
| | 3 | MPV MIC signal |
| | 4 | GND GND |
| CN4 | 1 | CV2 CAR volume 2 |
| | 2 | CV1 CAR volume 1 |
| CN5 | 1 | GND M/C GND for DSP-10. |
| | 2 | DMC MIC signal for DSP-10. |
| CN6 | 1 | RFB1 RF GAIN reference voltage. |
| | 2 | RFB2 GND |
| | 3 | PHL2 Processor level controlled signal |
| | 4 | GND GND |
| CN7 | 1 | GND GND |
| | 2 | SCAF Main band SSB and CW mode AF output. |
| | 3 | GND GND |
| | 4 | FAAF Main band FM and AM mode AF output. |
| | 5 | GND GND |
| CN8 | 1 | +15 +15V. |
| | 2 | GND GND |
| | 3 | -12 -12V |
| CN9 | 1 | +15 +15V |
| | 2 | -12 -12V |
| | 3 | FMNC FM NARROW mode controlled signal |
| | 4 | SSBC SSB mode controlled signal |
| | 5 | FMC FM mode controlled signal |
| | 6 | CWC CW mode controlled signal |
| | 7 | FSKC FSK mode controlled signal |
| | 8 | DB On signal for DSP-10 |
| | 9 | TXB +15V when transmit |
| | 10 | RXB +15V when receive |
| | 11 | STS Sidetone switch. |
| | 12 | SQ Squelch signal. |
| | 13 | NG2 NB2 gate controlled signal. |
| | 14 | NG1 NB1 gate controlled signal. |
| CN10 | 1 | 88FD 455kHz IF filter select signal. |
| | 2 | 88FE 455kHz F filter select signal. |
| | 3 | 88FC 455kHz F filter select signal. |
| | 4 | 88FB 455kHz F filter select signal. |
| | 5 | 88FA 455kHz F filter select signal. |
| | 6 | MNG2 NB2 gate controlled signal. |
| | 7 | MNG1 NB1 gate controlled signal. |

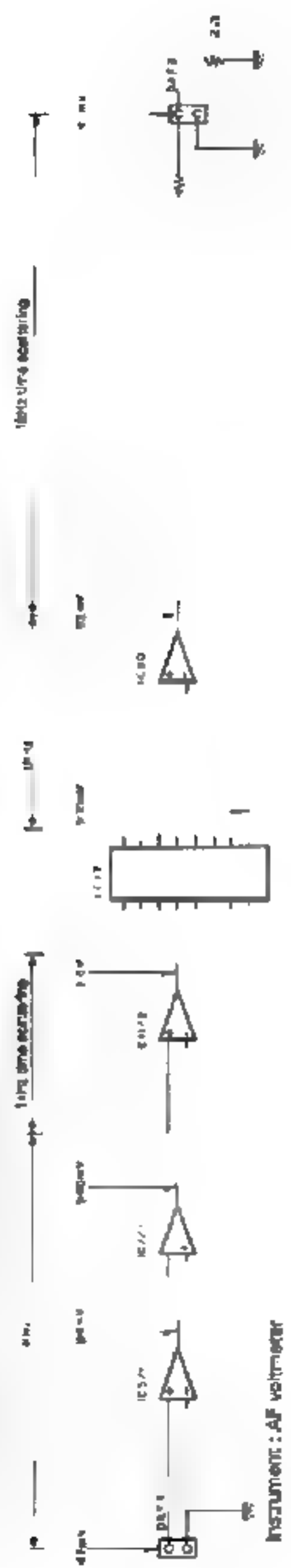
TERMINAL FUNCTION

| Connector | Terminal | | Terminal function |
|-----------|----------|------|-------------------------|
| No. | No. | Name | |
| | 8 | SQ | Squelch signal. |
| | 9 | STS | Sidescane switch. |
| | 10 | NC | Not used. |
| CN11 | 1 | ATS | Antenna tuner switch. |
| | 2 | MOS | Monitor switch. |
| CN12 | 1 | GND | GND |
| | 2 | ATS1 | Antenna tuner switch. |
| | 3 | MOS | Monitor switch. |
| | 4 | AGC | AGC line. |
| | 5 | TXB | +15V when transmit. |
| | 6 | RXB | +15V when receive. |
| | 7 | +15 | +15V |
| CN13 | 1 | AGC | AGC line. |
| | 2 | MOS | Monitor switch. |
| | 3 | RXB | +15V when receive. |
| | 4 | TXB | +15V when transmit. |
| | 5 | -12 | -12V |
| | 6 | +15 | +15V |
| | 7 | GND | GND |
| | 8 | SMET | S-meter voltage output. |

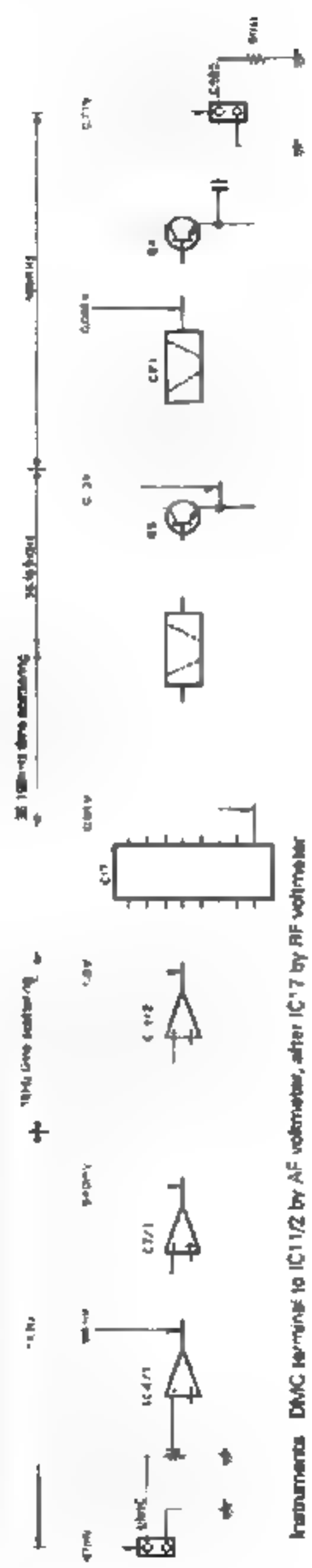
| Connector | Terminal | | Terminal function |
|-----------|----------|-------|---------------------------|
| No. | No. | Name | |
| CN14 | 1 | NOTS | NOTCH switch. |
| | 2 | NFM15 | +15V except FM mode. |
| | 3 | FSQ1 | FM squelch volume 1. |
| | 4 | FSQ2 | FM squelch volume 2. |
| | 5 | SQ2 | CAR squelch volume 2. |
| | 6 | NOTS | NOTCH switch. |
| | 7 | NOV2 | NOTCH volume 2. |
| | 8 | SO1 | CAR squelch volume 1. |
| | 9 | GND | GND |
| CN15 | 1 | IFO2 | IF OUT2 output. |
| | 2 | GND | GND |
| CN16 | 1 | C100 | 100kHz CAR input. |
| | 2 | GND | GND |
| | 3 | C355 | 355kHz local input. |
| | 4 | GND | GND |
| CN17 | 1 | TR455 | TX/RX 455kHz I/O. |
| | 2 | GND | GND |
| CN18 | 1 | DB | On signal for DSP-10. |
| | 2 | GND | GND |
| | 3 | D455 | 455kHz input from DSP-10. |

LEVEL DIAGRAM

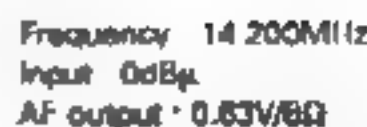
DSP-10 receiver section (AF-SLOPE)



DSP-10 transmitter section (USB)

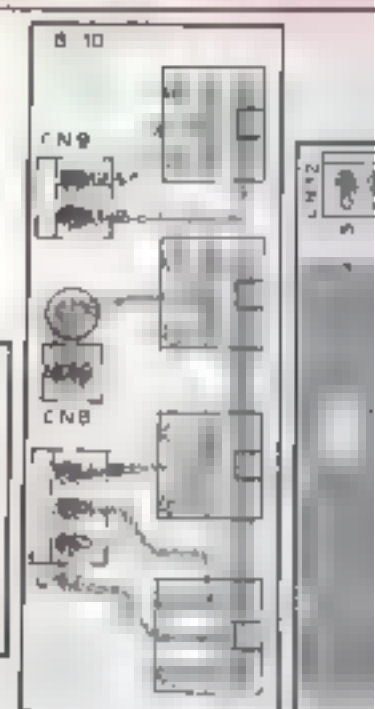
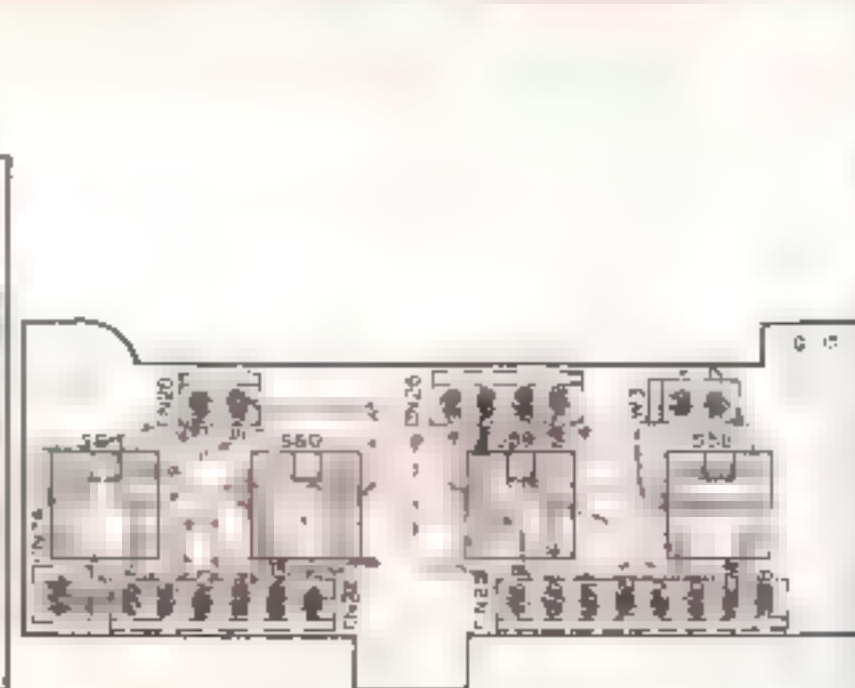
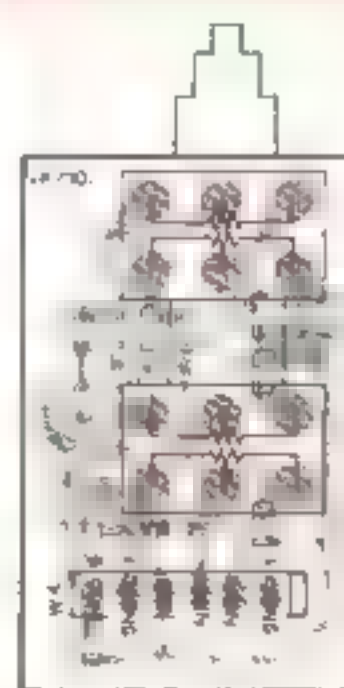
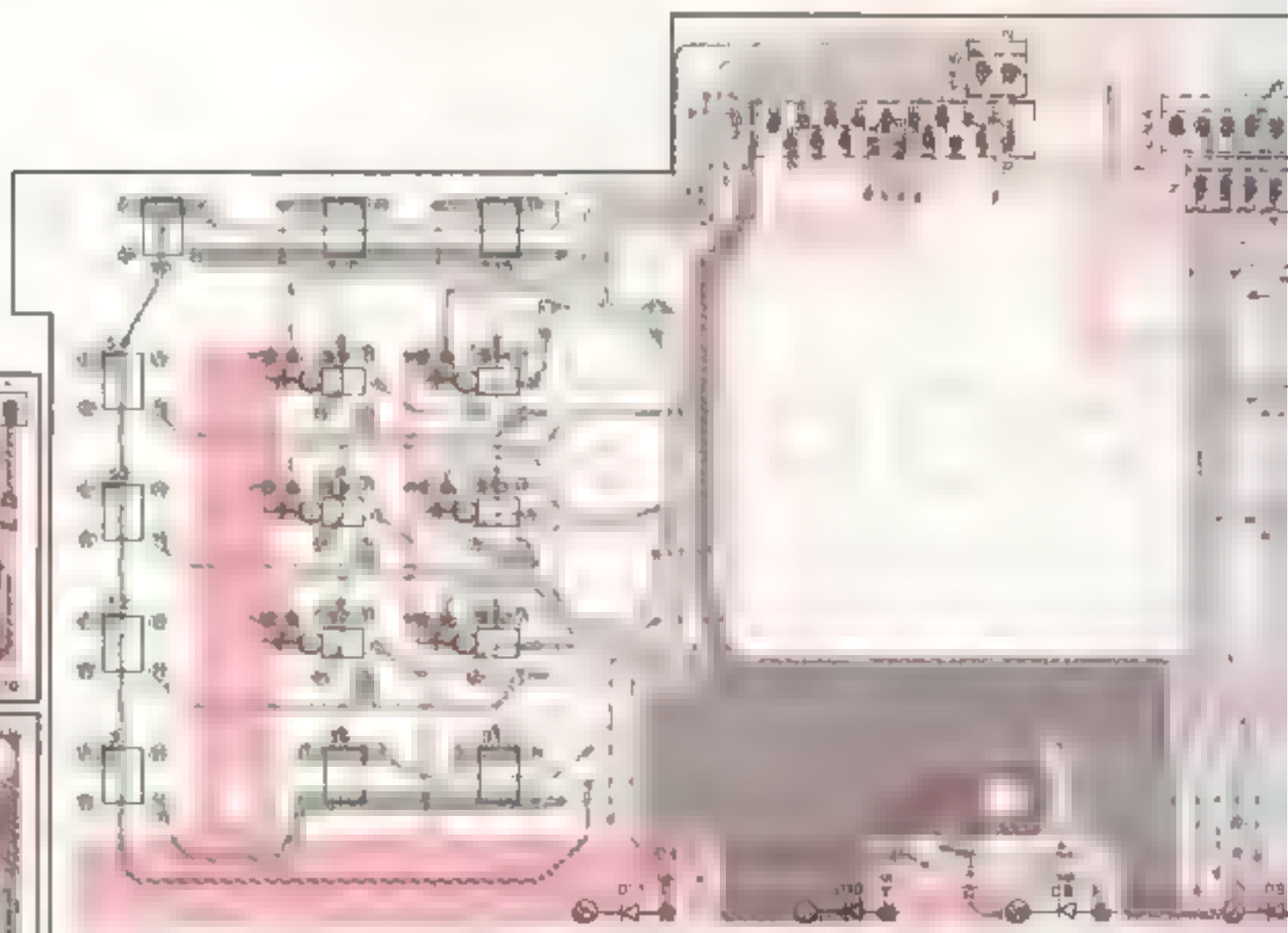
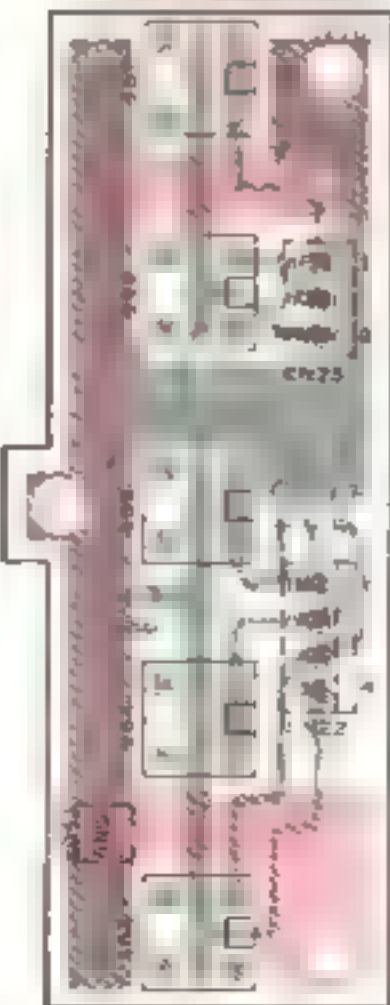
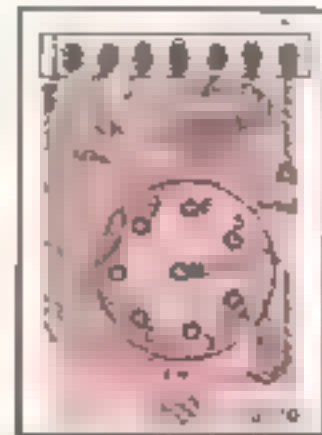
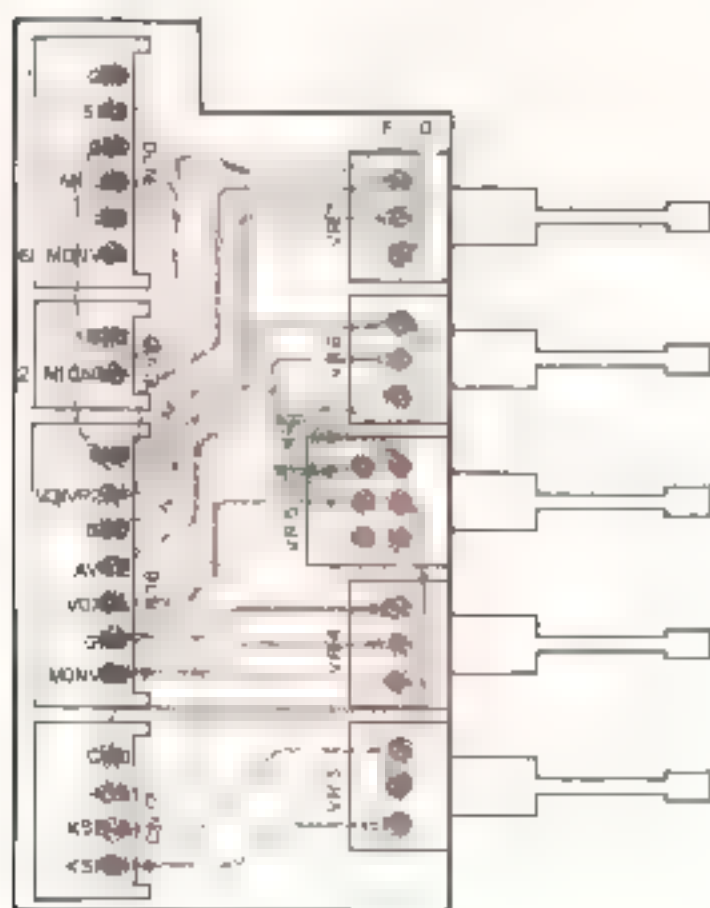
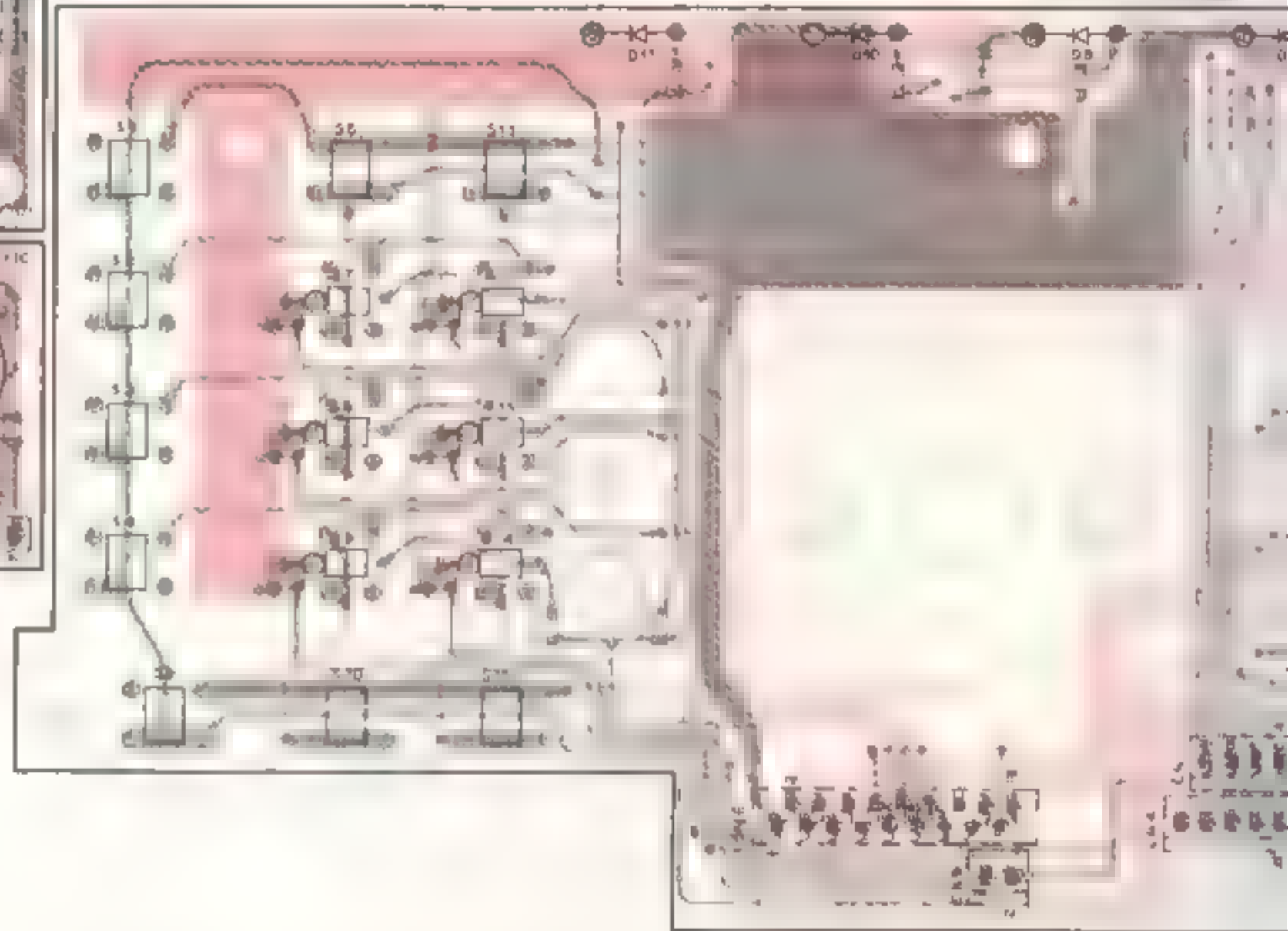
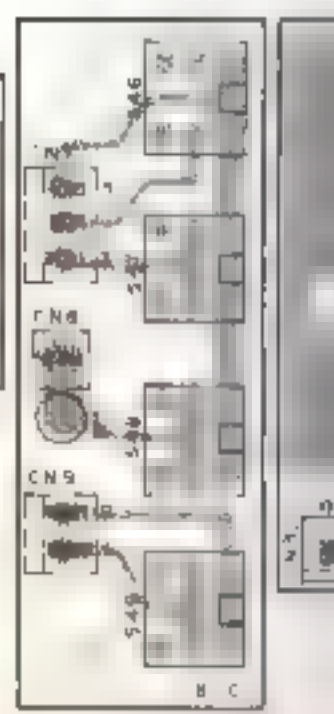
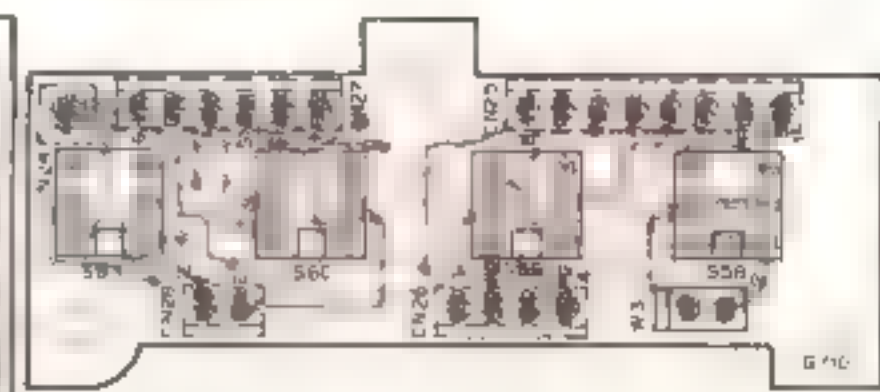
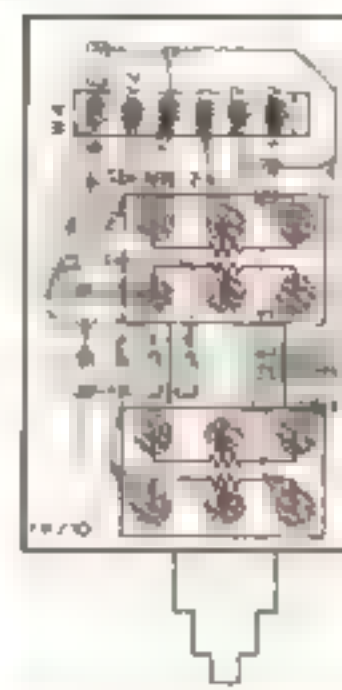
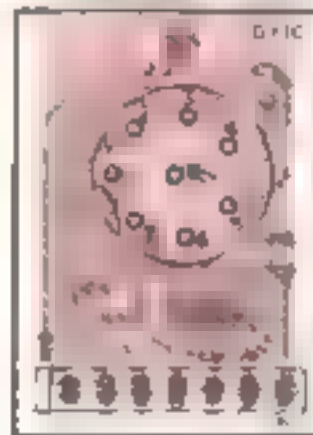
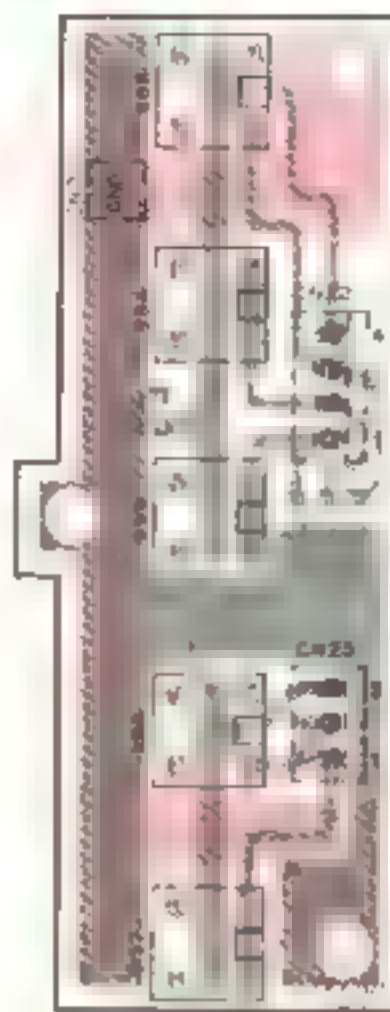
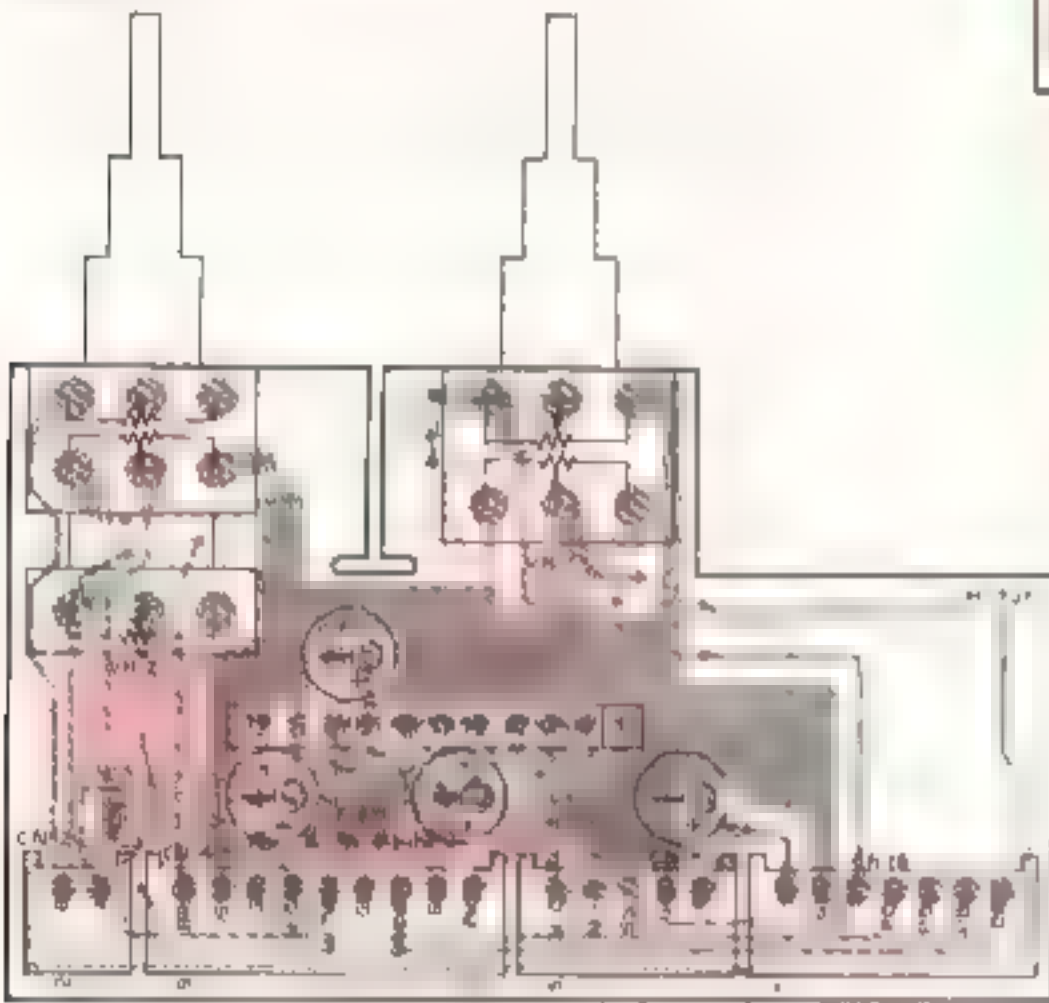


DIAGRAM

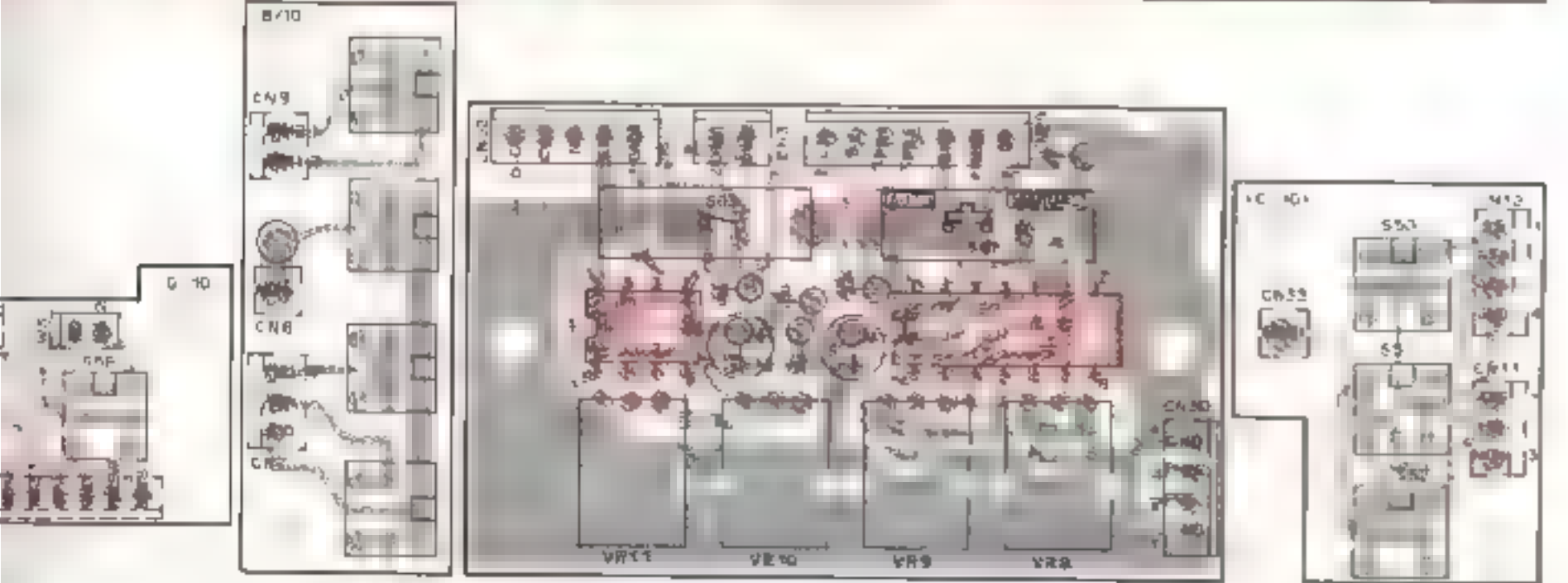
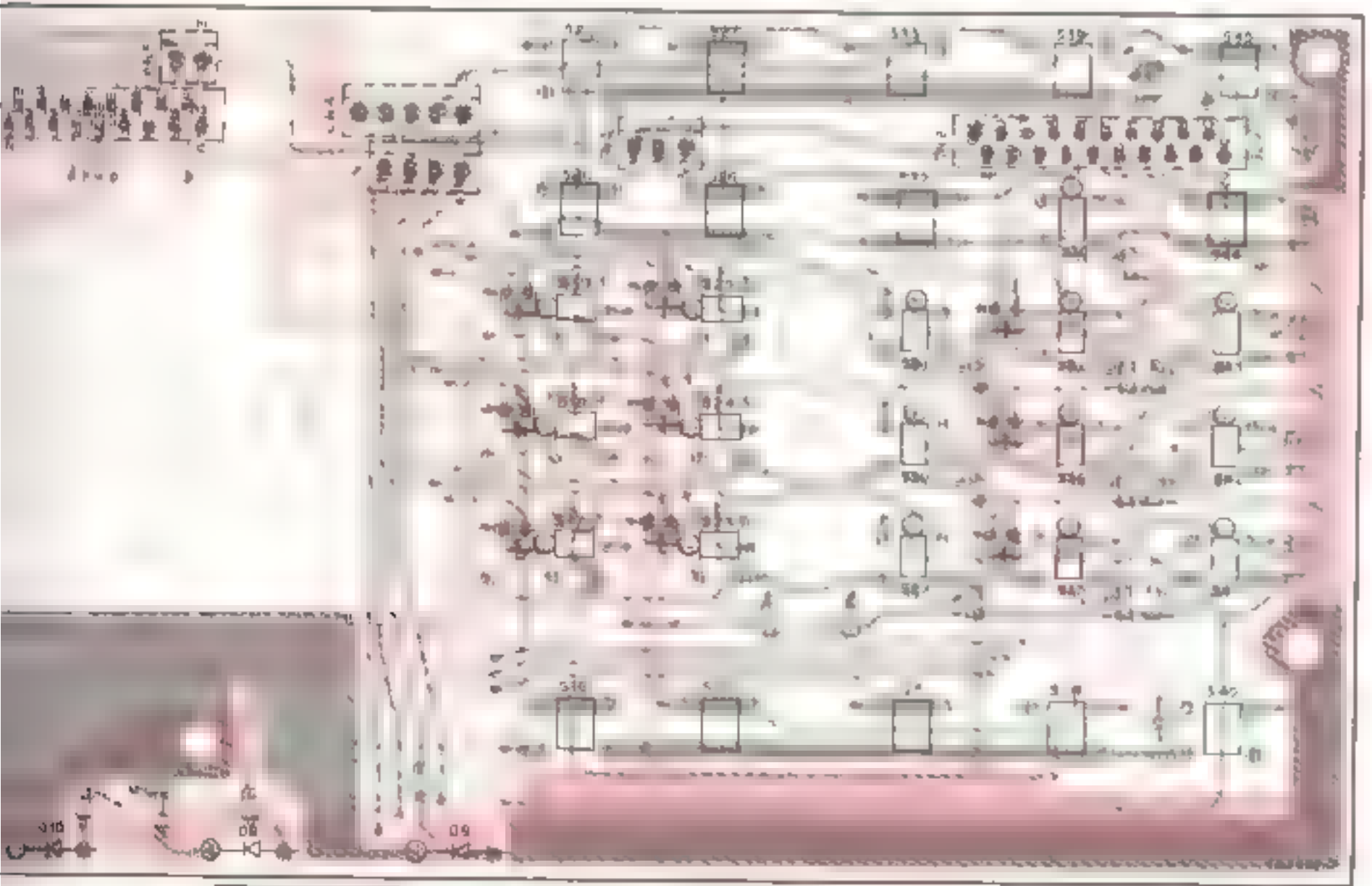
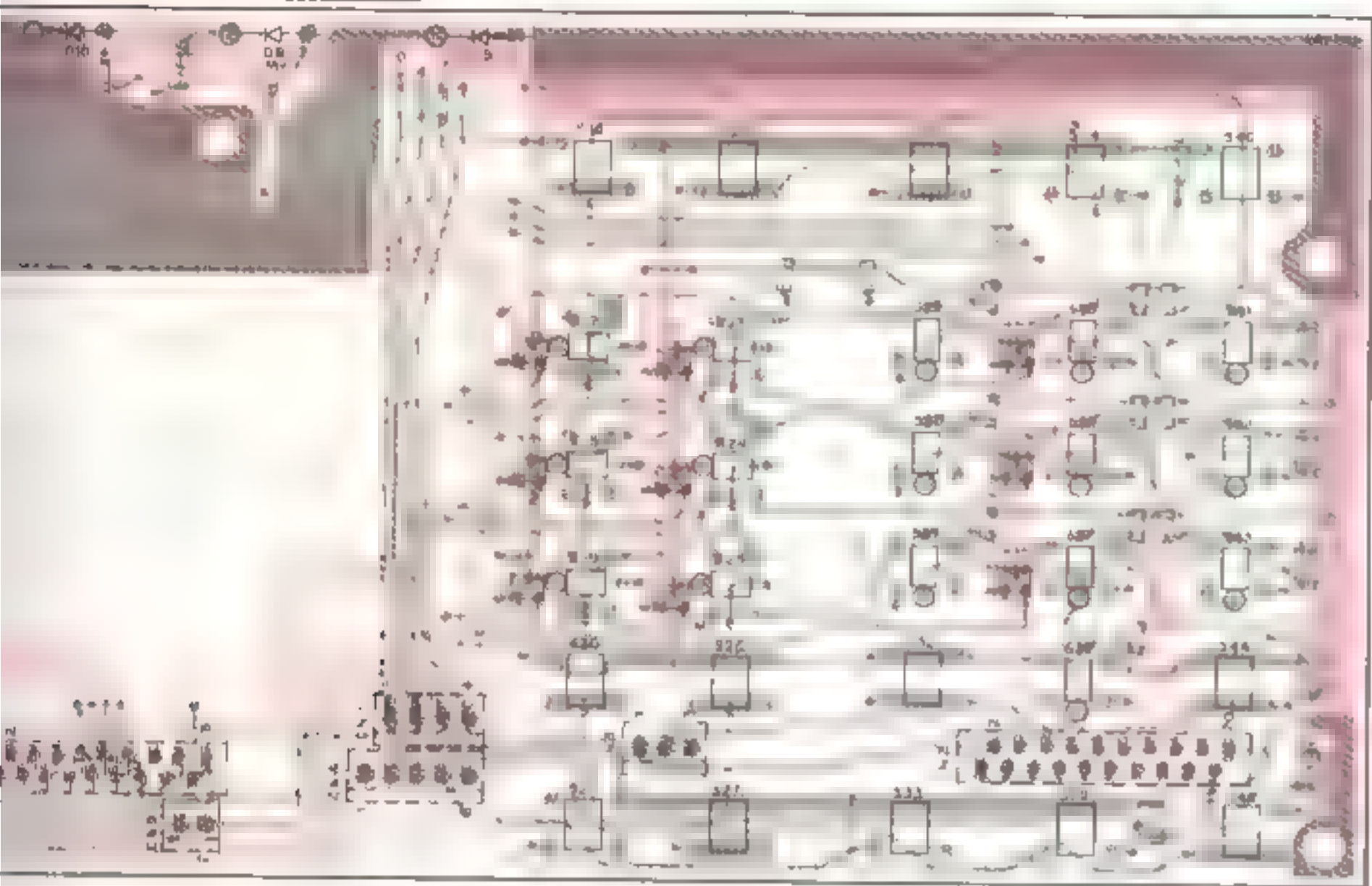
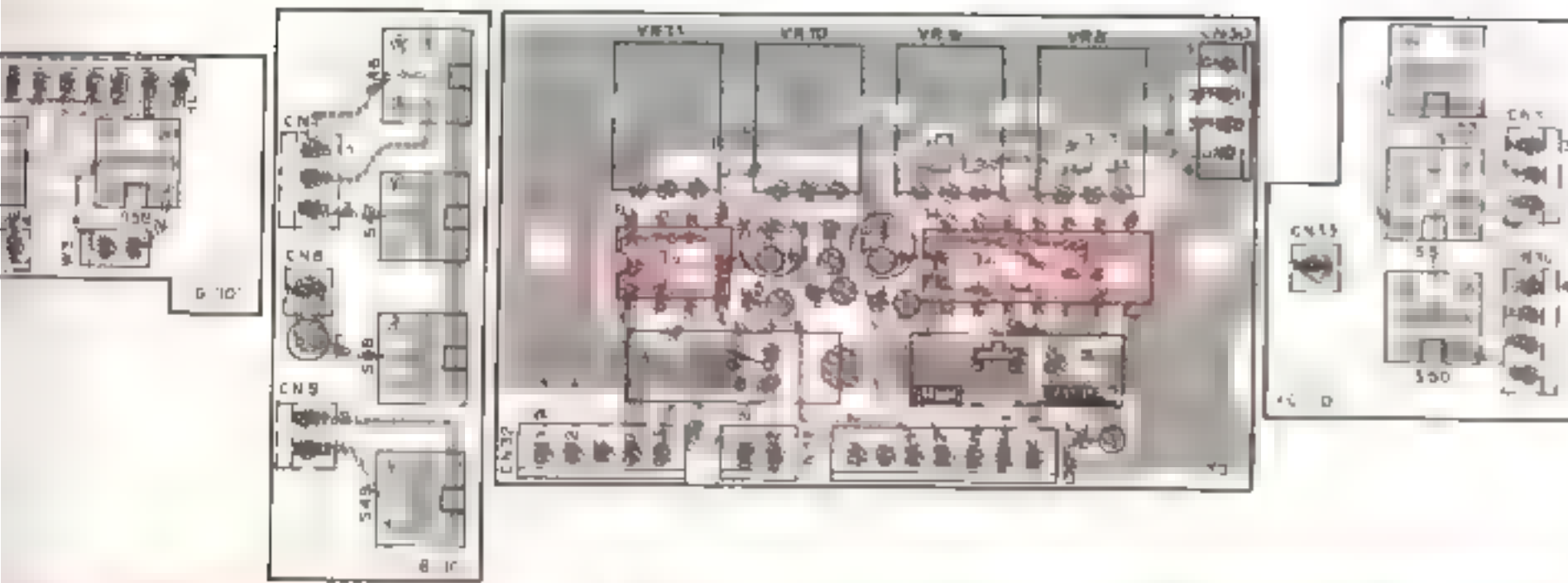


1. The figures shown are signal generator output required for a constant audio output with a constant AF gain control setting.
Set the AF gain control for 0.53V/60 audio output at 0dB_s signal generator input at 14.200MHz.
2. To measure signal generator output connect a 0.01 μ F capacitor between the signal generator and the check point.
3. A/F OFF

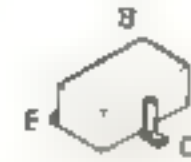
1. The high frequency section is measured by the HF voltmeter in the CV mode, and the low frequency section is measured using the AF voltmeter in the USB mode to obtain this value.
2. The value of the audio input signal is obtained by the 1kHz/5mV single tone which measures almost full scale within the ALC zone of the meter in the USB mode or standard modulation ($\pm 3\text{kHz}$, dev.) in the FM mode.
3. When the value of the audio input signal is obtained by the 4kHz single tone which adjusts almost full scale within the ALC zone of the meter by PROC OUT VR, and also, adjust starting level within the COMP zone of the meter by PROC IN VR.



PC BOARD VIEWS TS-950S/SD



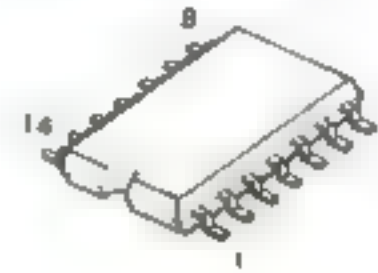
2SC3324
DTC143EK
DTC143TK



NE555P

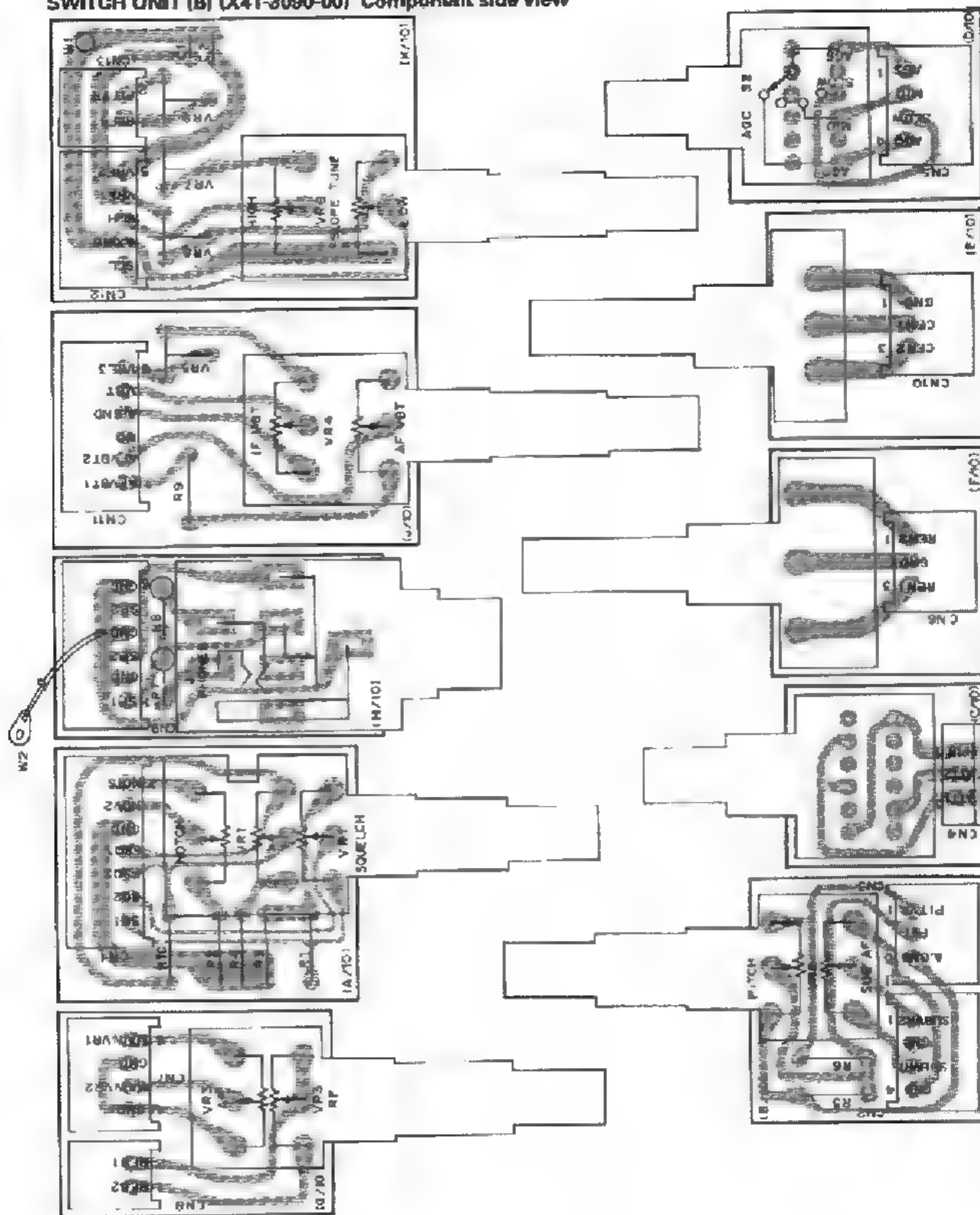


TC4066BP



TS-950S/SD PC BOARD VIEW / CIRCUIT DIAGRAM

SWITCH UNIT (B) (X41-3090-00) Component side view



2SC2712
2SC3907
DTC114EK



2SA1358



2SB941



2SD16245



μPC7805H



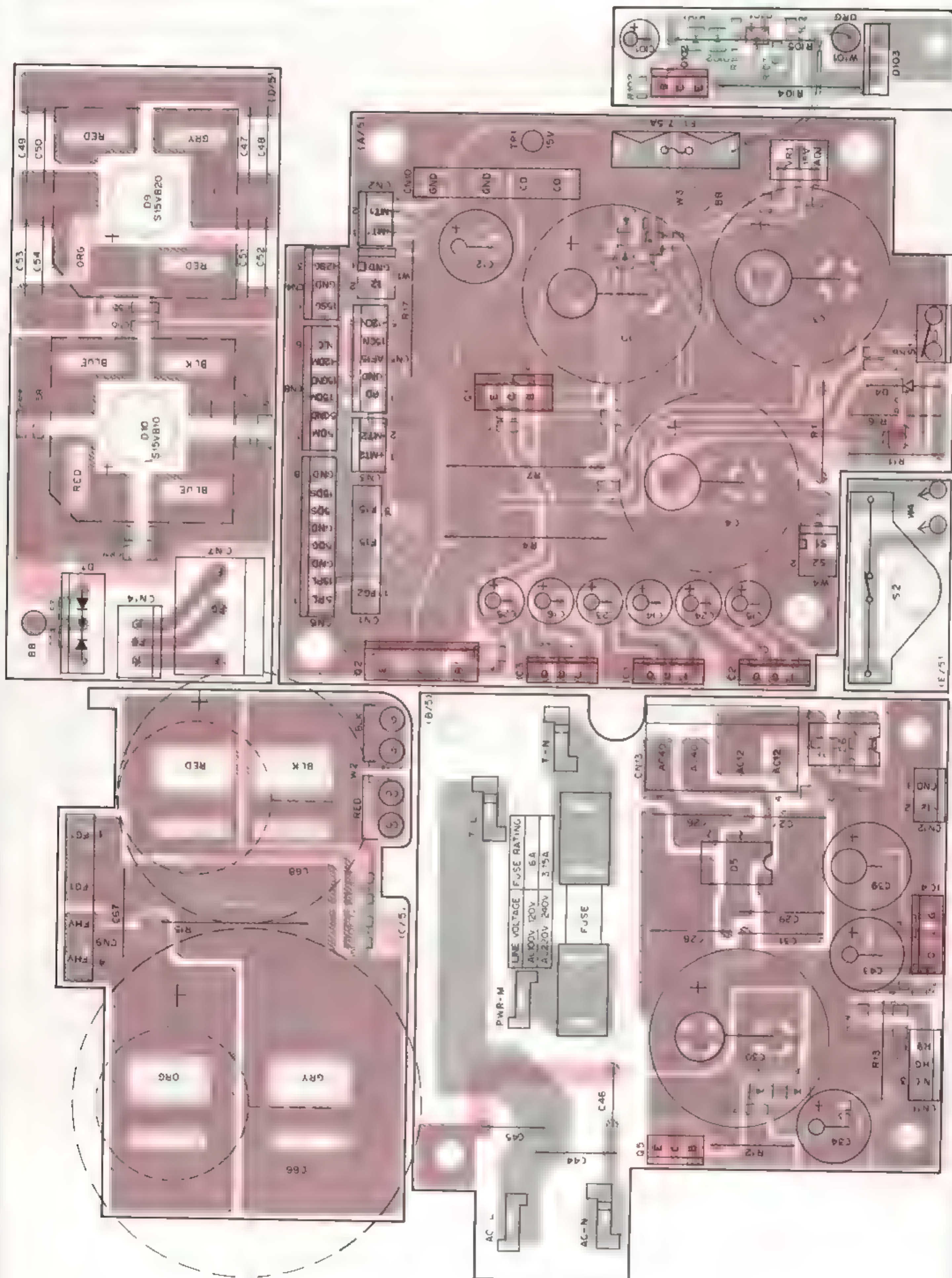
μPC7912HF



②

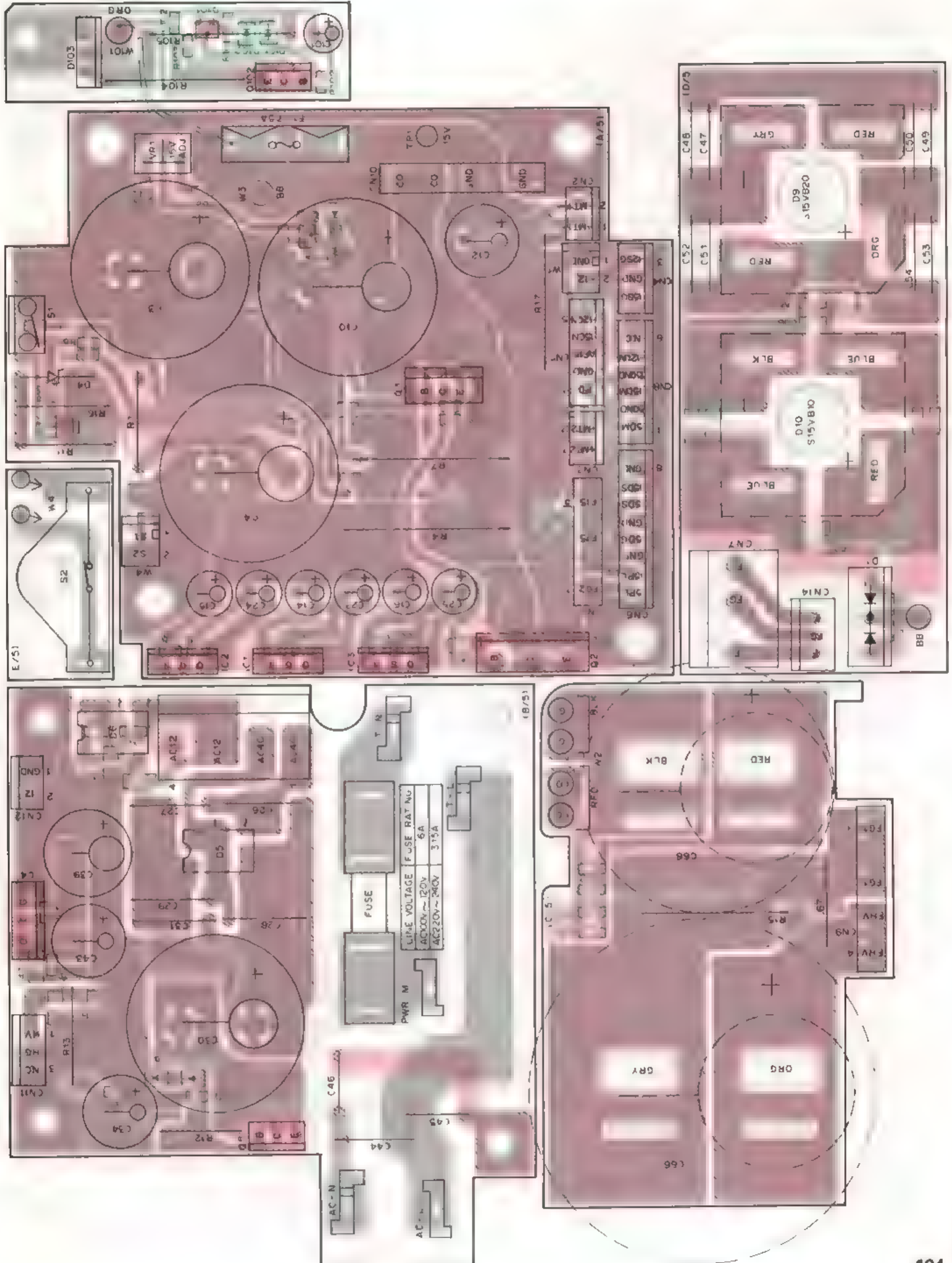


AVR UNIT (X43-3070-01) Component side view



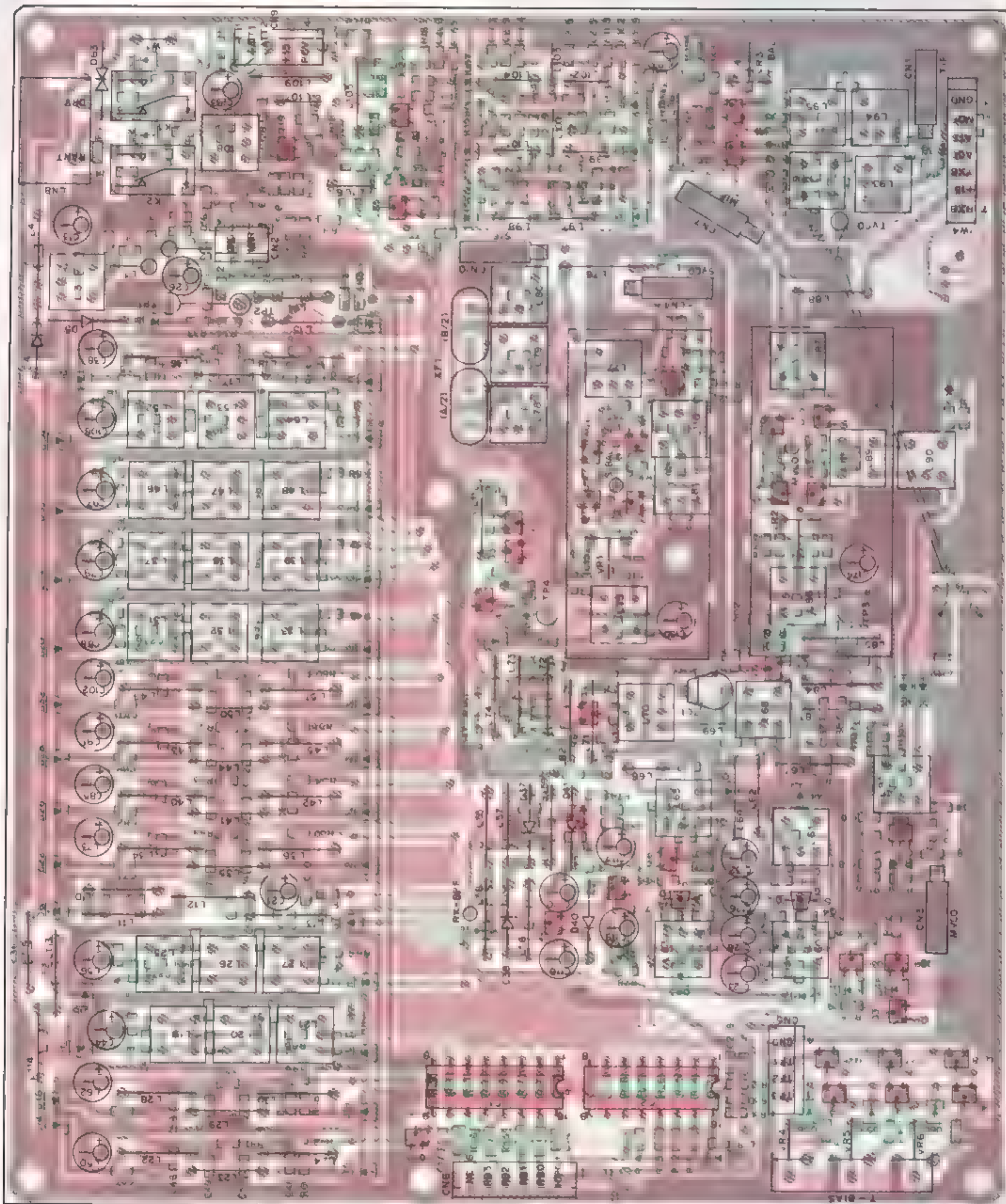
PC BOARD VIEWS TS-950S/SD

AVR UNIT (X43-3070-01) Foil side view

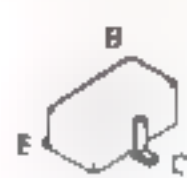


TS-950S/SD PC BOARD VIEWS

RF UNIT (X44-3100-00) Component side view



2SA1162
2SA2712
DTA114EK
DTA124EK
DTC114EK
DTC124EK
2SC2954



2SC2954



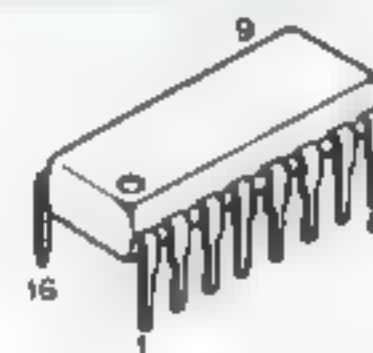
2SK125-5



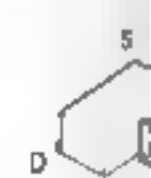
3SK131



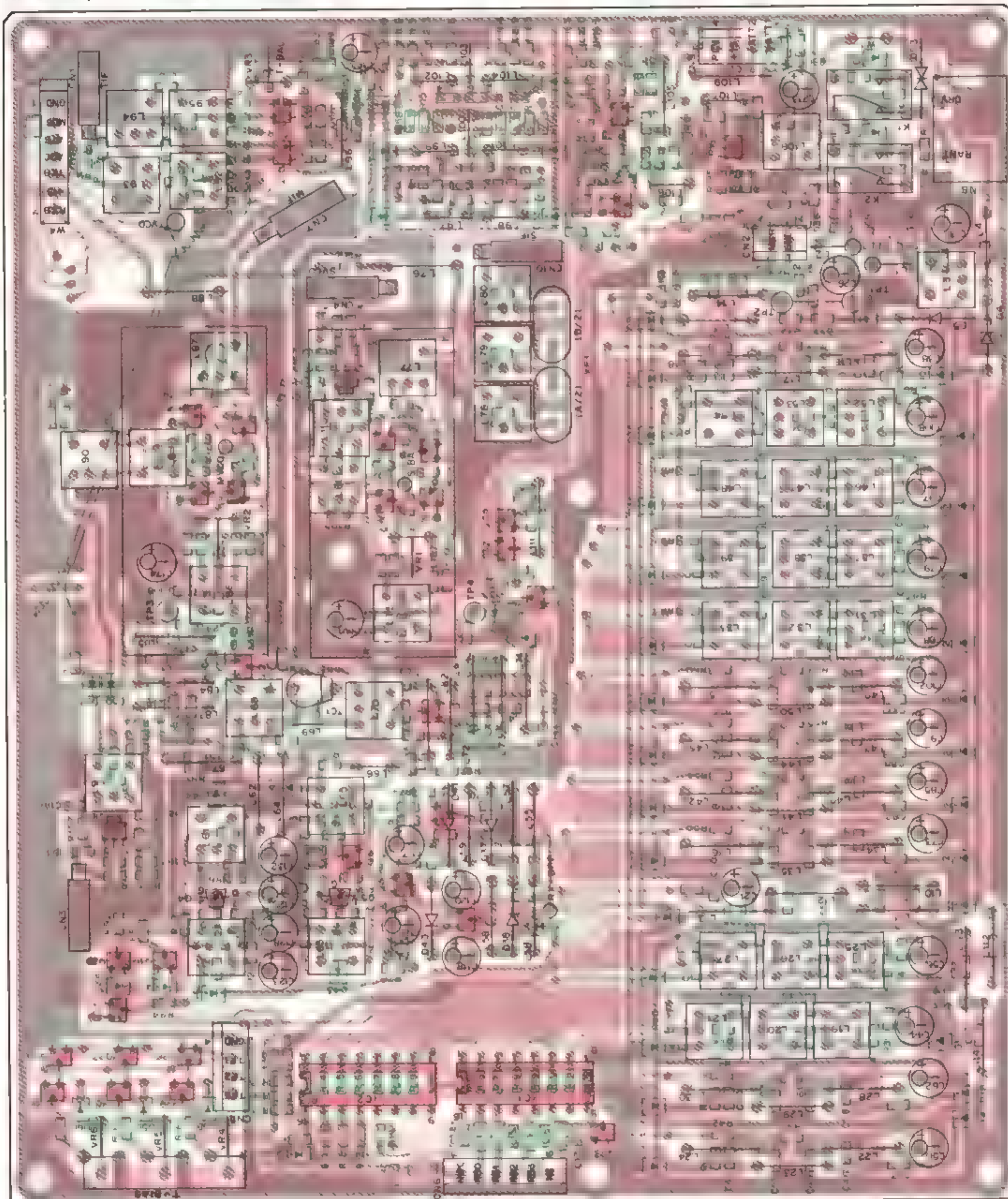
SN74LS145N



2SK520



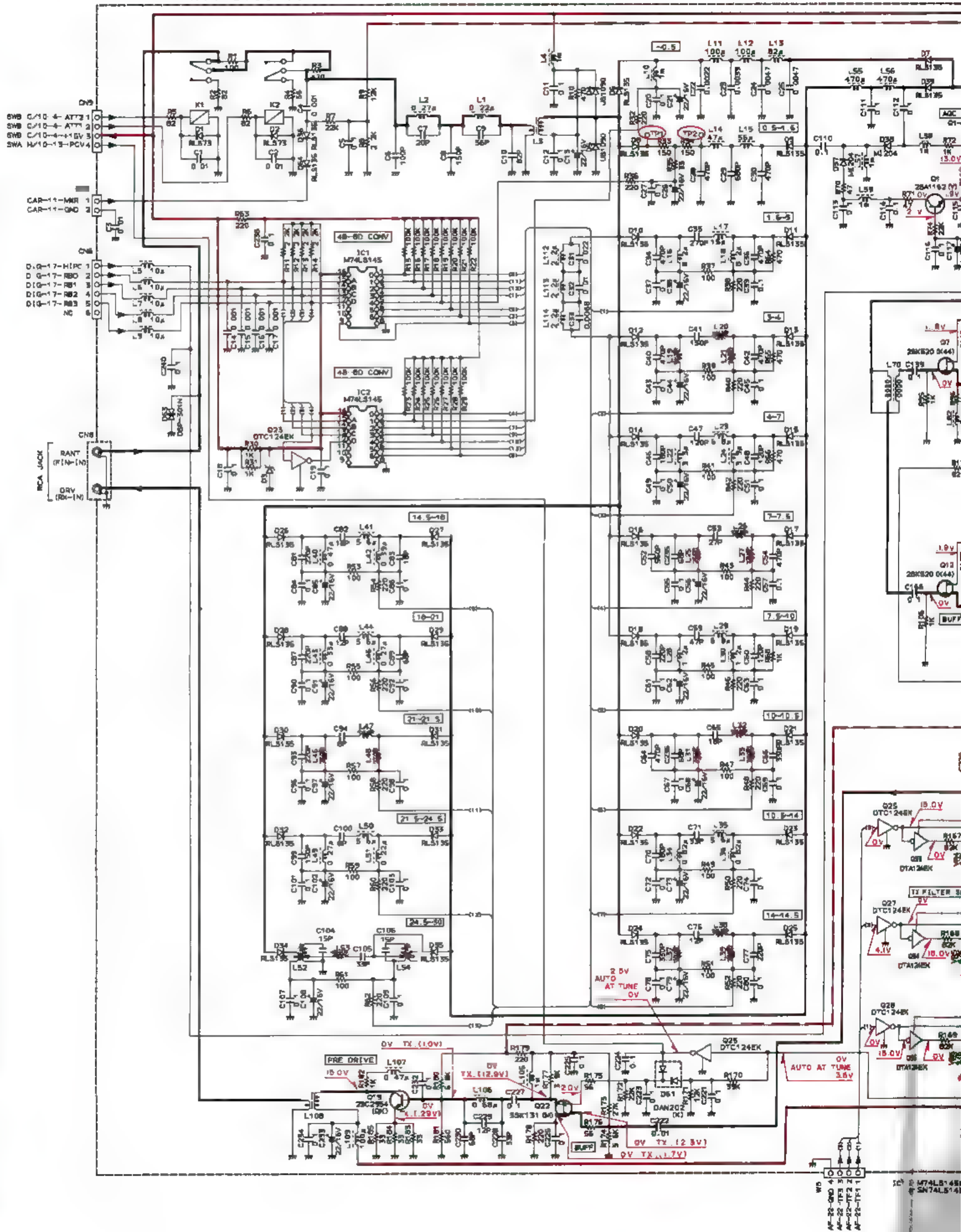
RF UNIT (X44-3100-00) Foil side view



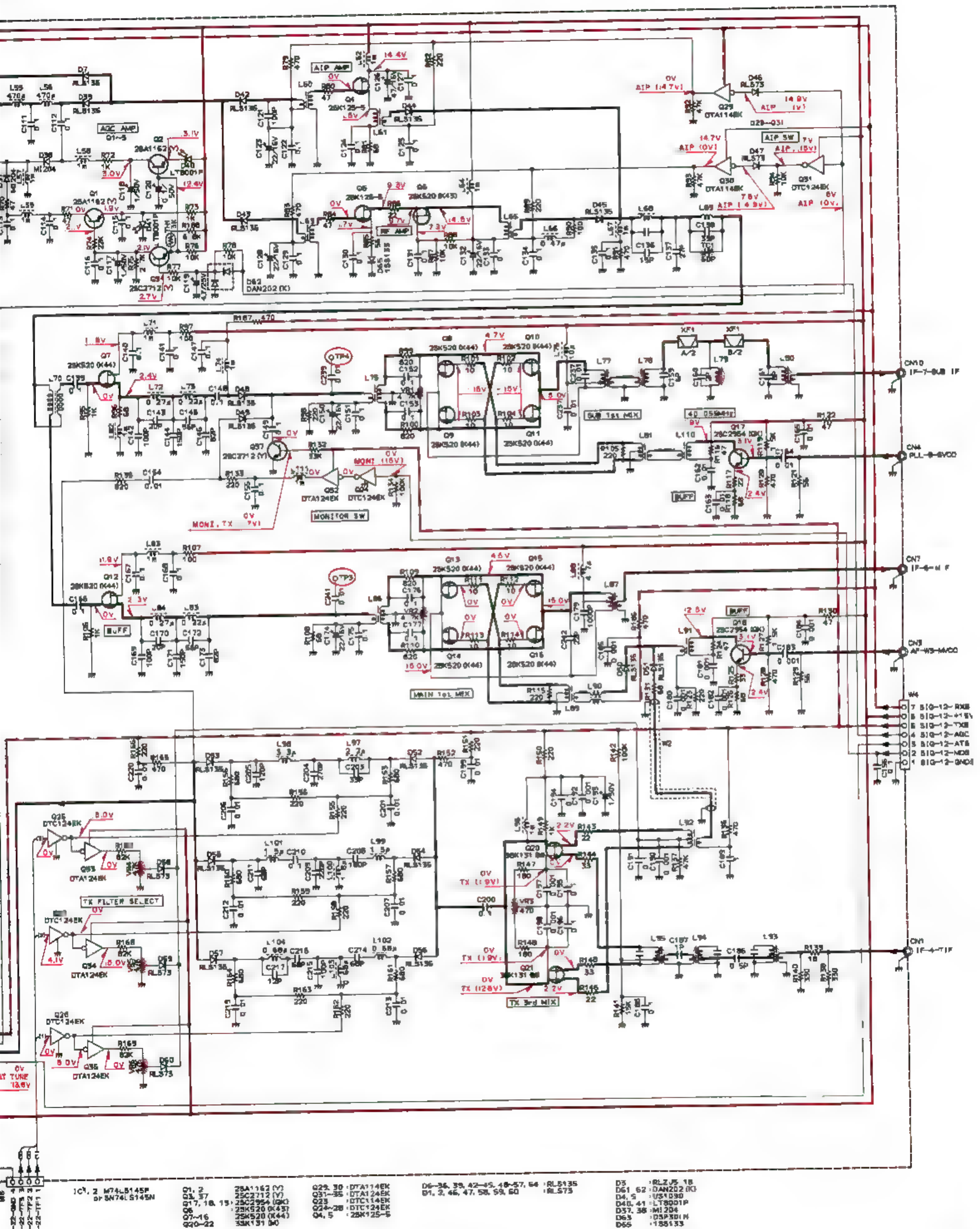
25K520



X44-3100-00

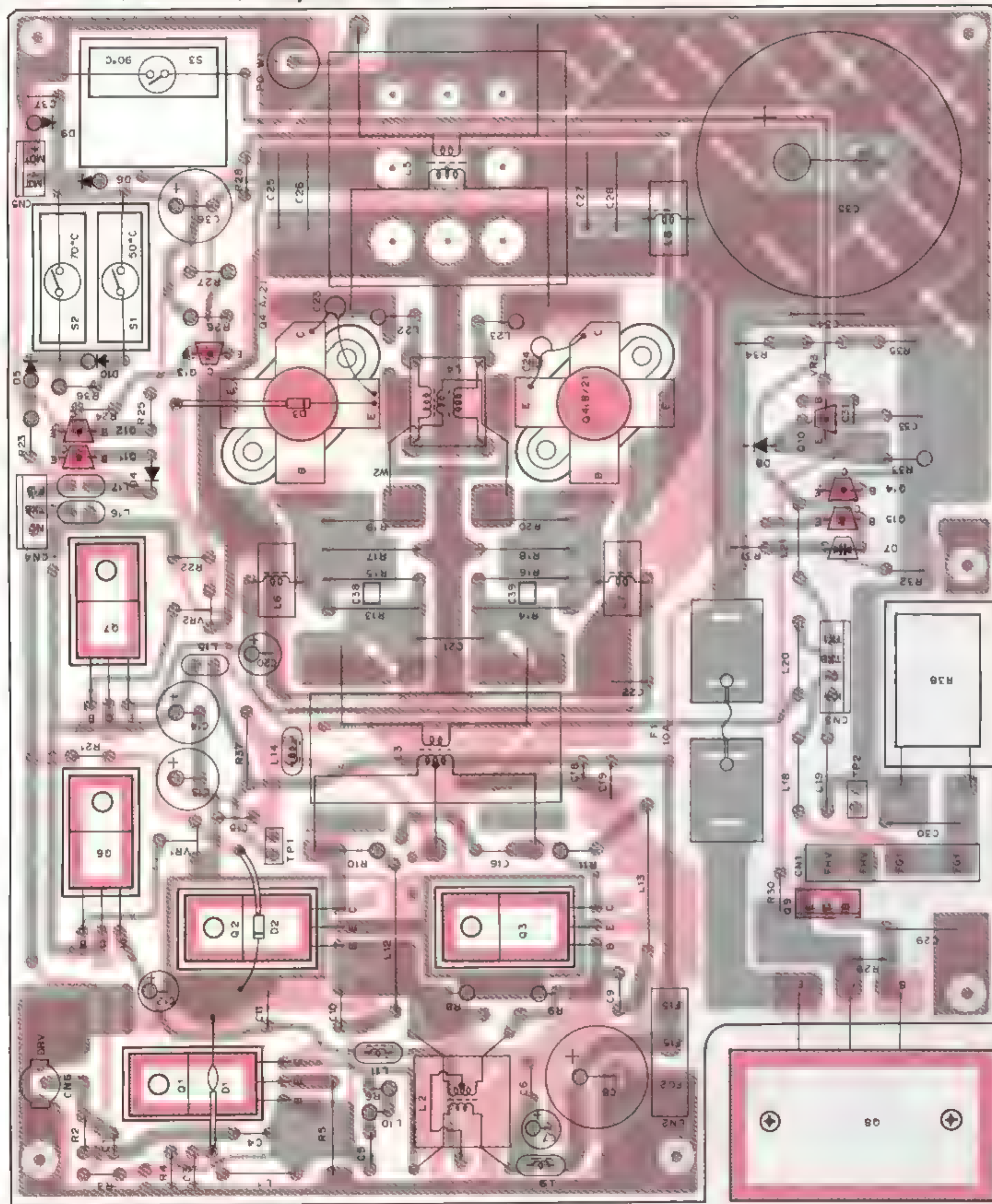


CIRCUIT DIAGRAM TS-950S/SD



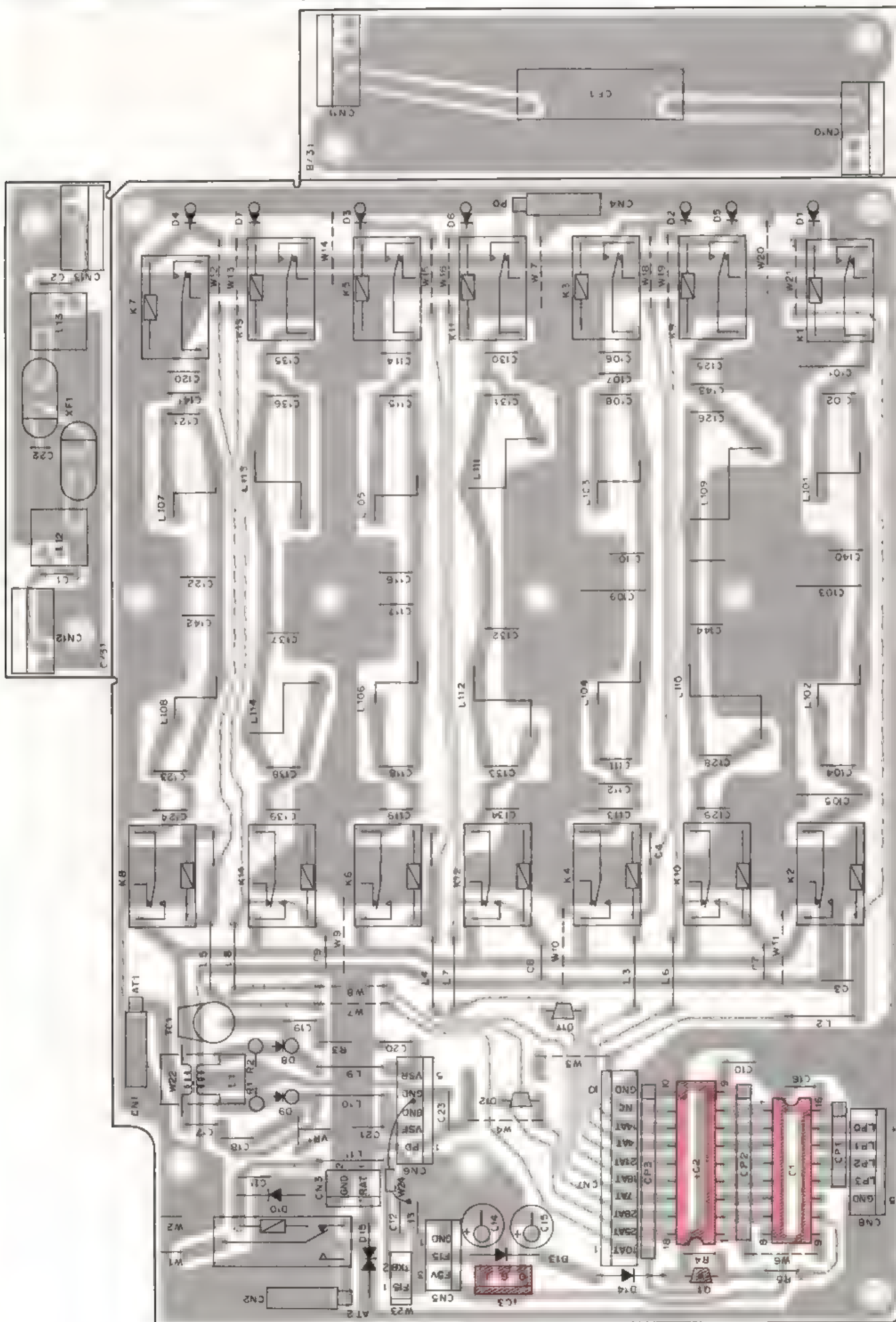
TS-950S/SD PC BOARD VIEWS

FINAL UNIT (X45-3330-00) Component side view



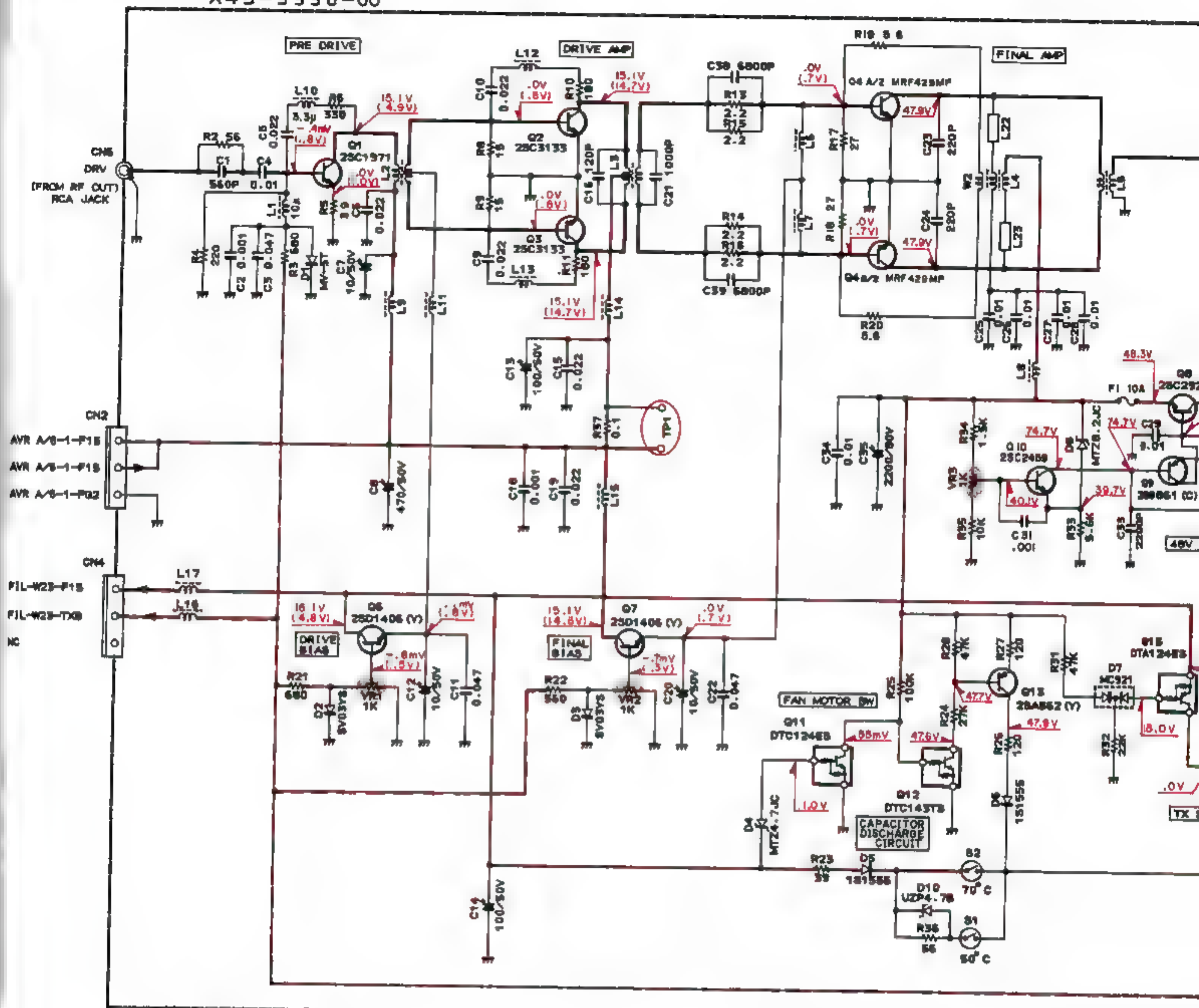
FILTER

FILTER UNIT (X51-3060-XX) Component side view



FINAL UNIT (X45-3330-00)

X45-3330-00

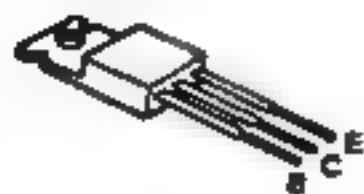


- | | |
|---------------------|--------------------|
| Q1 : 2SC1971 | Q11, 14 : DTC124ES |
| Q2, 3 : 2SC3133 | Q12 : DTC143TS |
| Q6, 7 : 2SD1406 (Y) | Q13 : 2SA562 (Y) |
| Q8 : 2SC2922 | Q15 : DTA124ES |
| Q9 : 2SC2459 (C) | |
| Q10 : 2SC2459 (BL) | |
| Q4 : MRF428MP | D1 : KB-365 |
| | D2, 3 : 5V03YS |
| | D4 : MTZ4-7JC |
| | D5, 6, 9 : 1S1555 |
| | D7 : MC921 |
| | D8 : MTZ8-2JC |
| | D10 : UZP4-7B |

2SA562



2SB861
2SC1971



DTC124ES



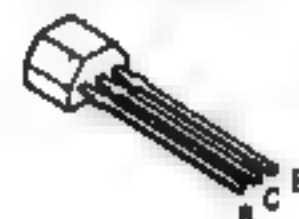
2SD1406



2SC2922



2SC2459
DTA124ES
DTC143TS

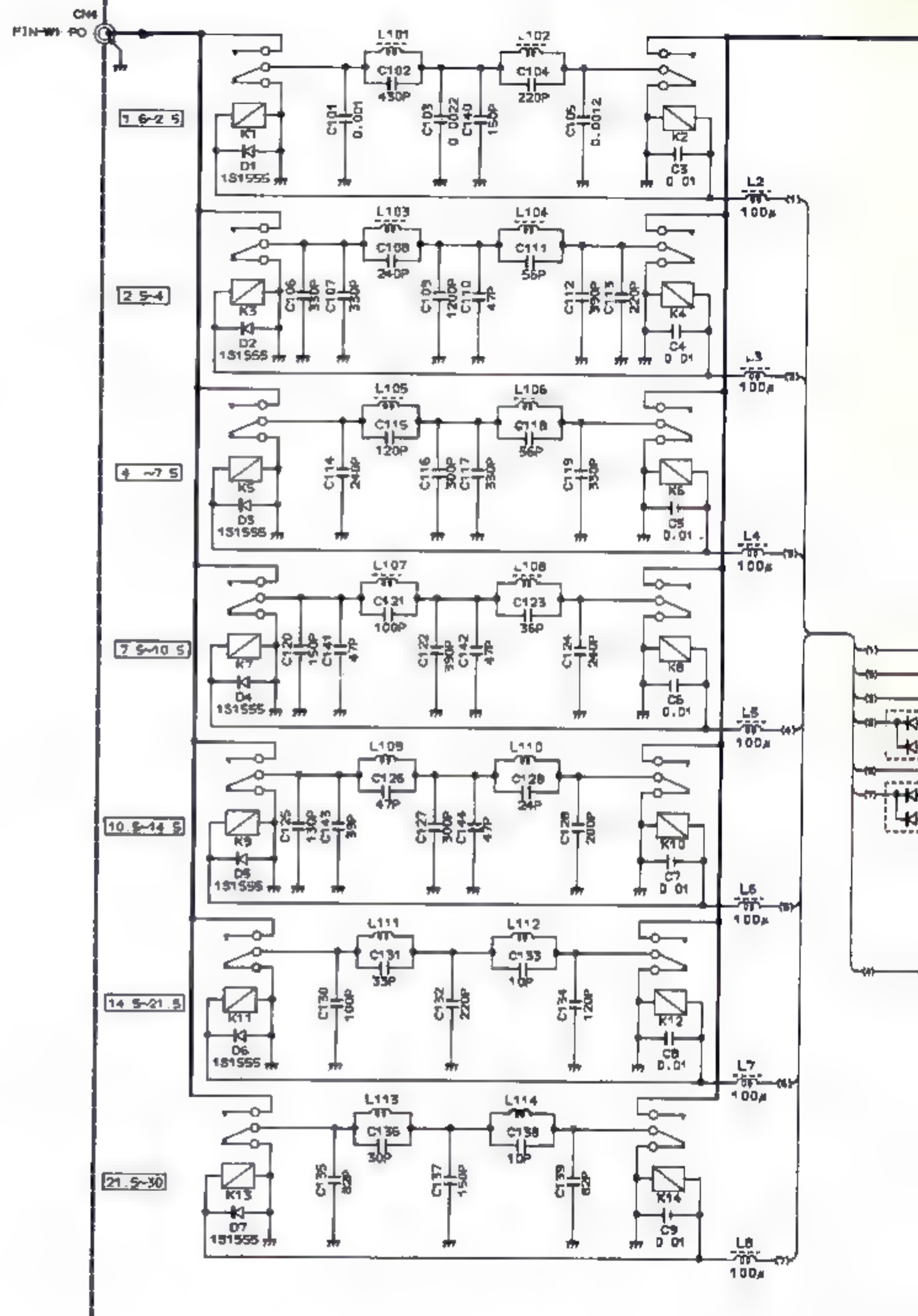
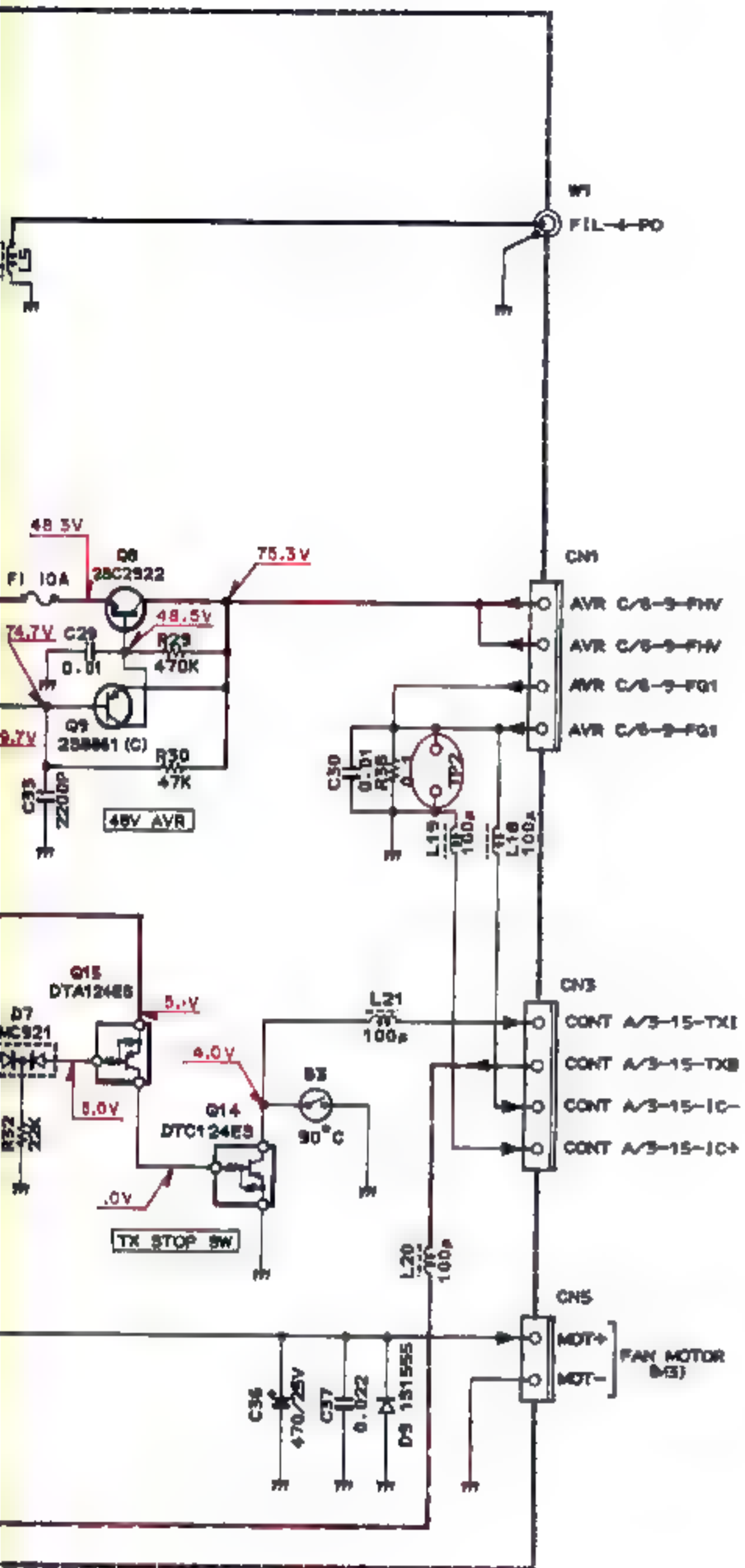


2SC



FILTER UNIT (X51-3060-XX) -01 : TS-950S (K,M,W,X,P) -61 : TS-950S (W2)

X51-3060-XX



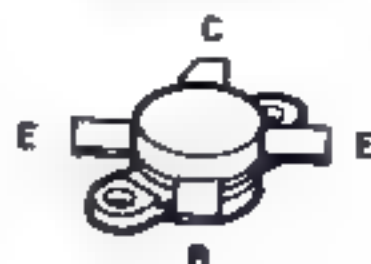
2SC3133



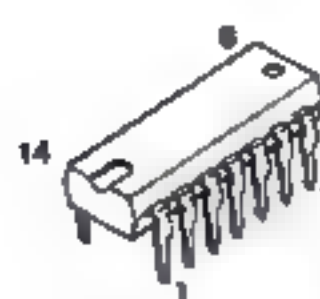
AN78N05



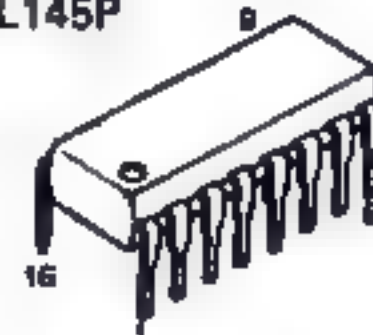
MRF427
MRF429MP



M54581P

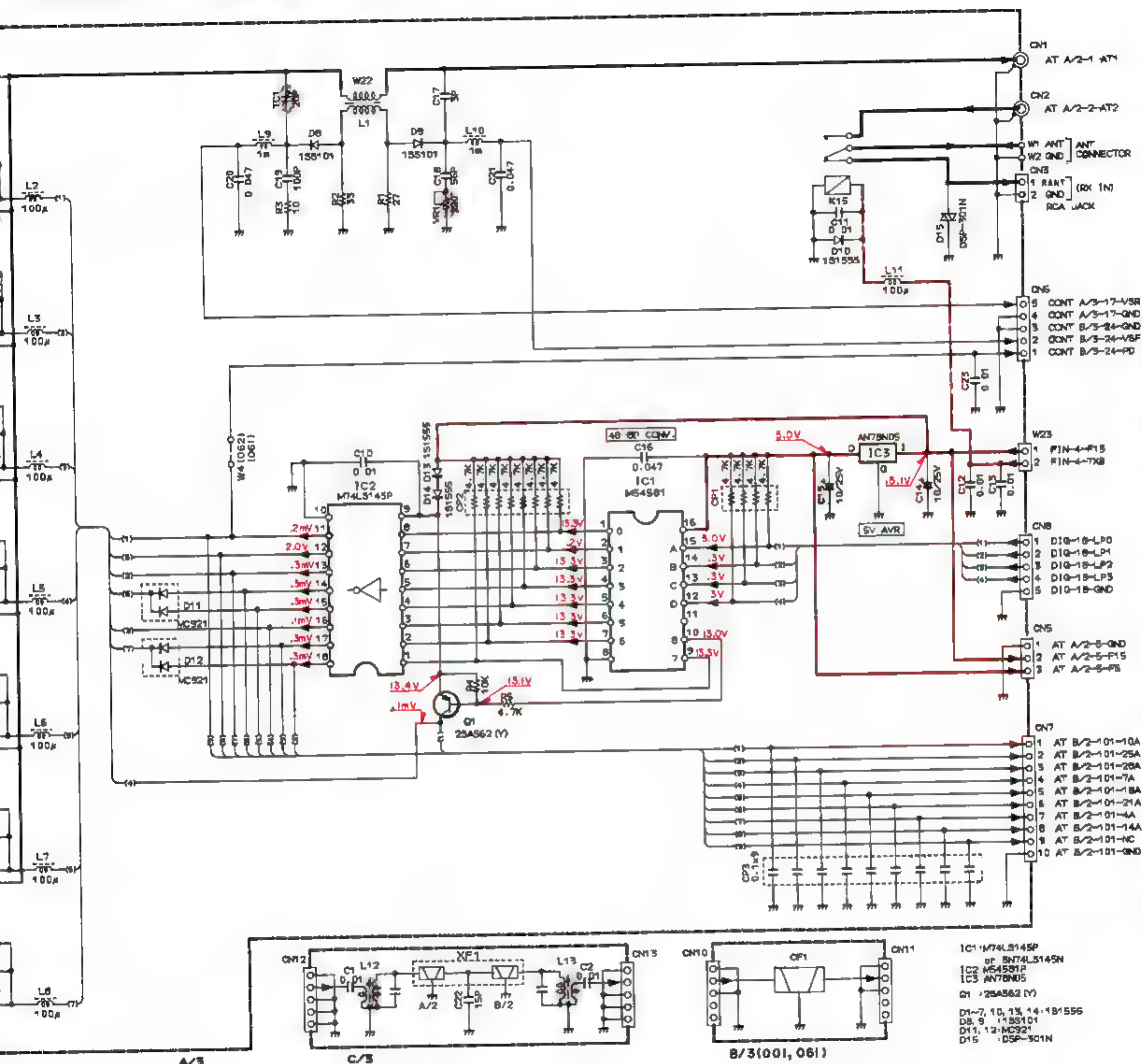


M74LS145N
M74SL145P



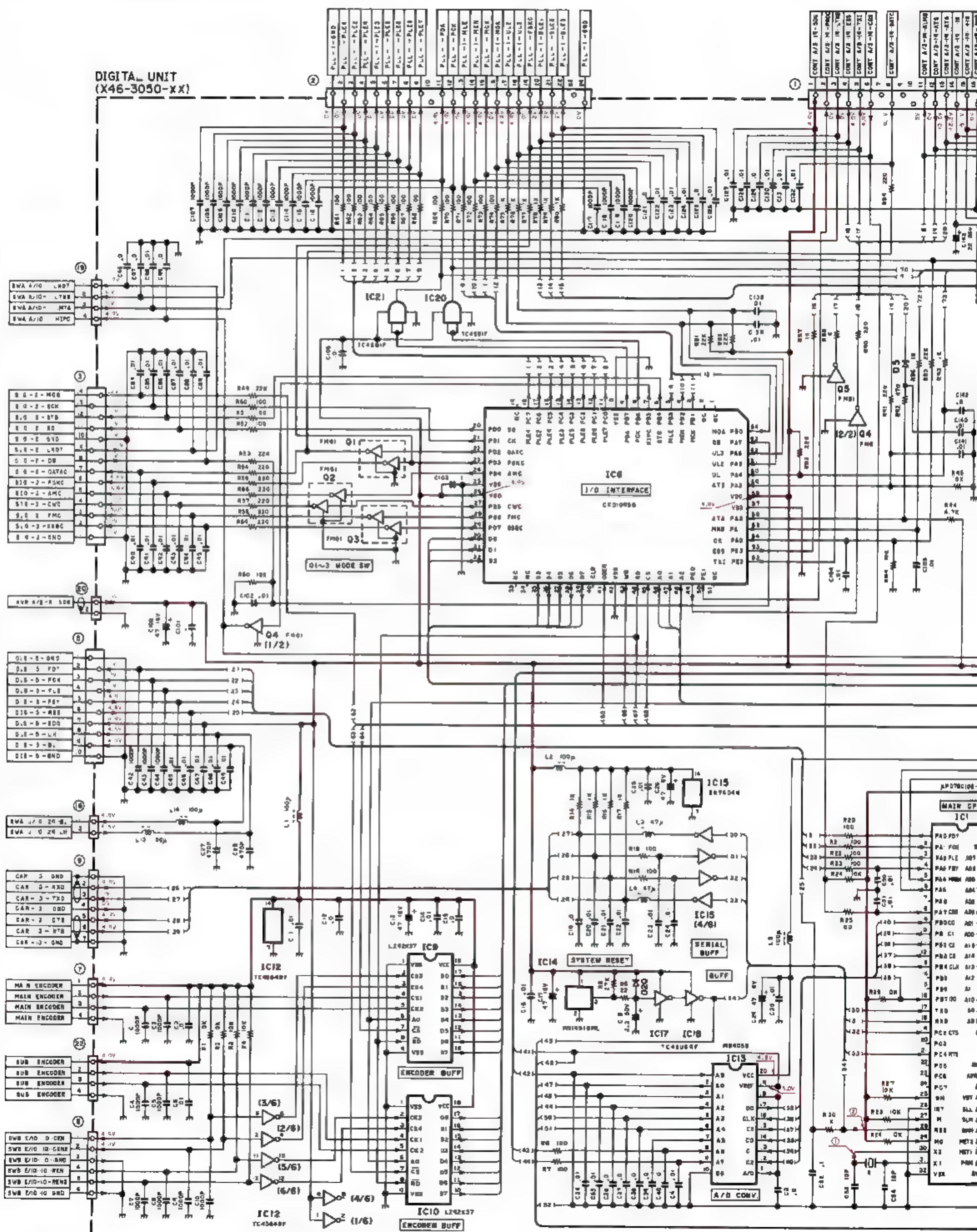
CIRCUIT DIAGRAMS TS-950S/SD

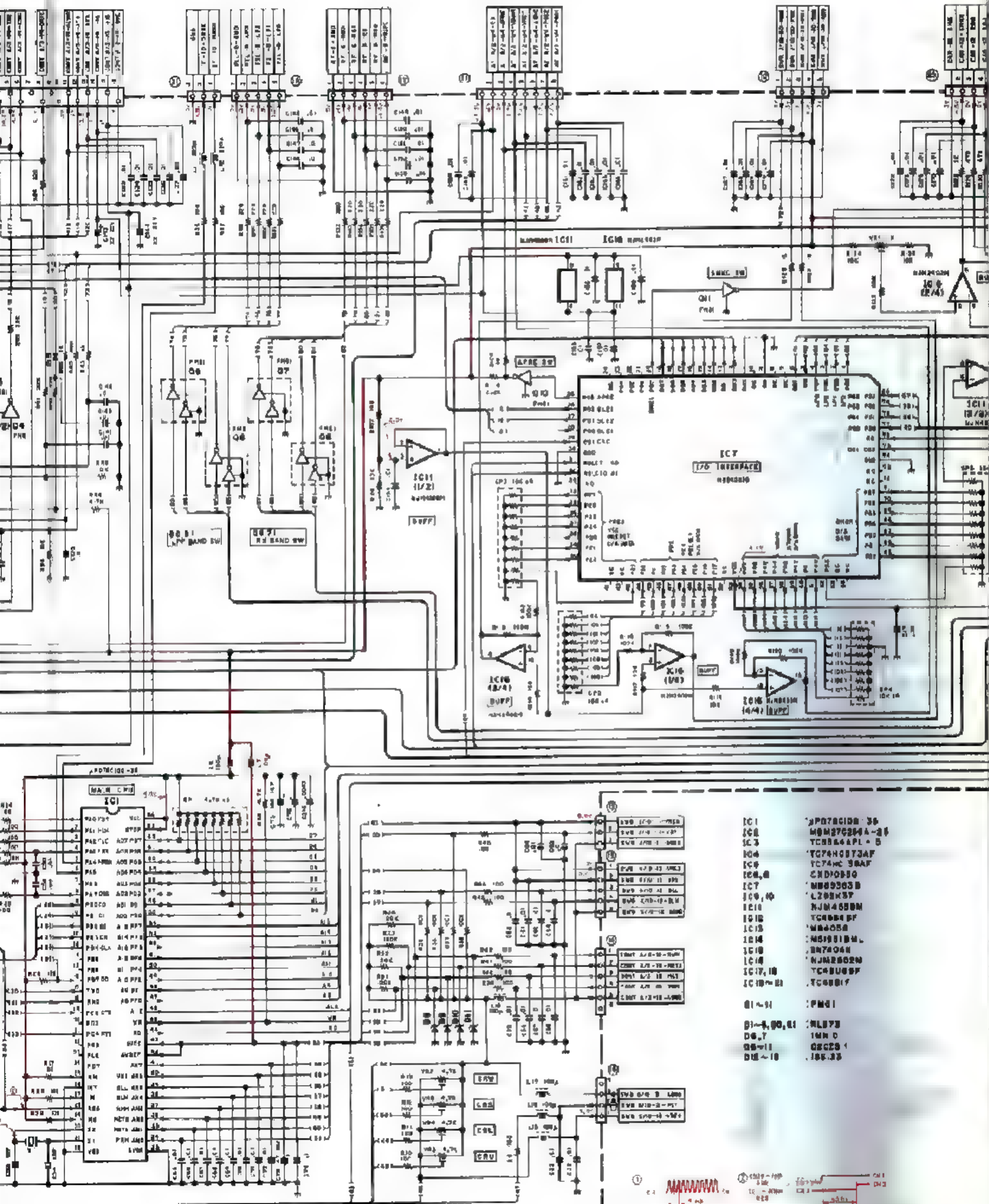
1 : TS-950S (W2) -11 : TS-950SD (K,M,W,X,P) -62 : TS-950SD (W2)



TS-950S/SD CIRCUIT DIAGRAM

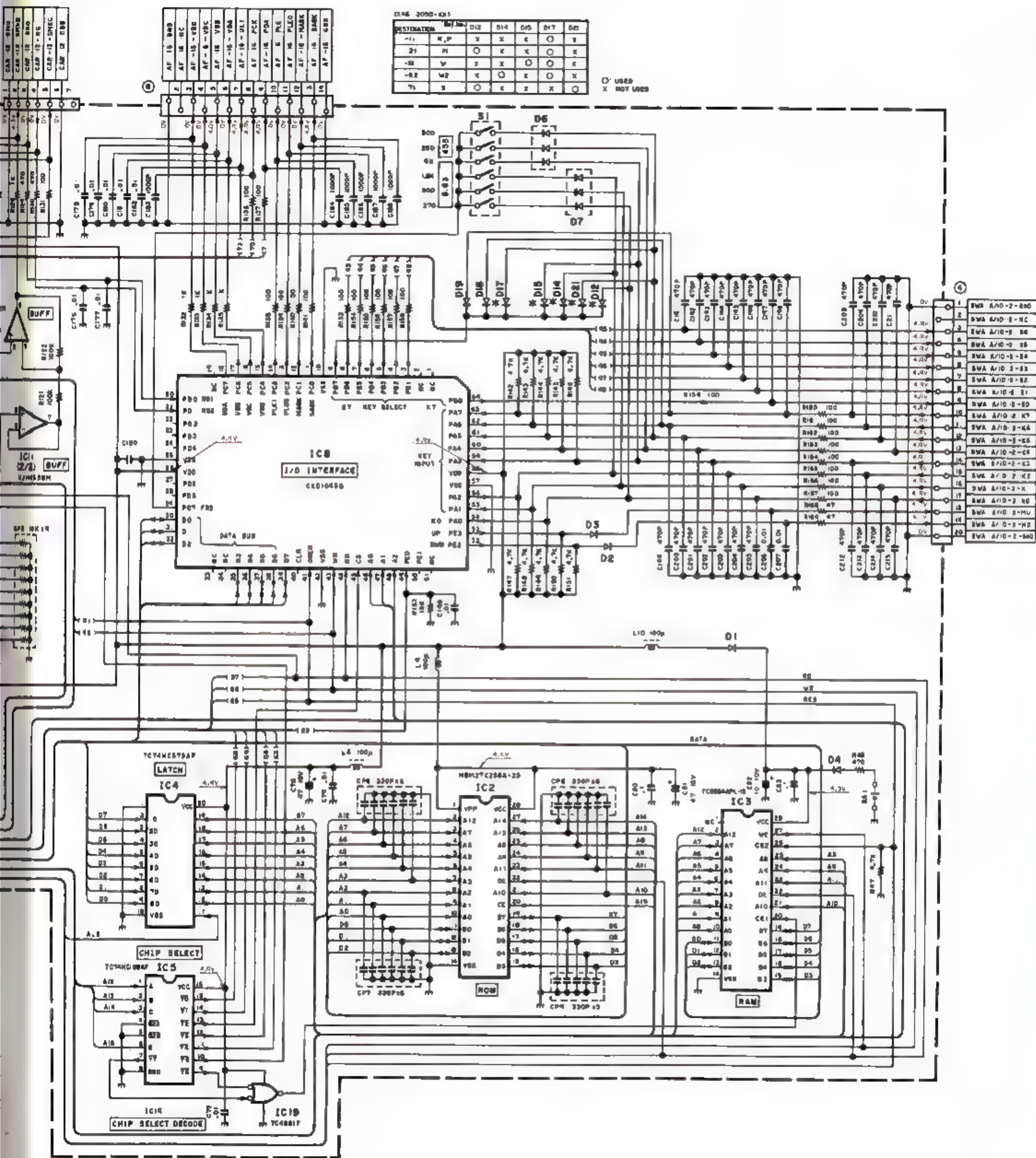
DIGITAL UNIT (X46-3050-XX) -11 : K,P -21 : M -61 : W -62 : W2 -71 : X





- IC1 7400
- IC2 7401
- IC3 7402
- IC4 7403
- IC5 7404
- IC6 7405
- IC7 74180
- IC8 7406
- IC9 7407
- IC10 7408
- IC11 7409
- IC12 7410
- IC13 7411
- IC14 7412
- IC15 7413
- IC16 7414
- IC17 7415
- IC18 7416
- IC19 7417
- IC20 7418
- IC21 7419
- IC22 7420
- IC23 7421
- IC24 7422
- IC25 7423
- IC26 7424
- IC27 7425
- IC28 7426
- IC29 7427
- IC30 7428
- IC31 7429
- IC32 7430
- IC33 7431
- IC34 7432
- IC35 7433
- IC36 7434
- IC37 7435
- IC38 7436
- IC39 7437
- IC40 7438
- IC41 7439
- IC42 7440
- IC43 7441
- IC44 7442
- IC45 7443
- IC46 7444
- IC47 7445
- IC48 7446
- IC49 7447
- IC50 7448
- IC51 7449
- IC52 7450
- IC53 7451
- IC54 7452
- IC55 7453
- IC56 7454
- IC57 7455
- IC58 7456
- IC59 7457
- IC60 7458
- IC61 7459
- IC62 7460
- IC63 7461
- IC64 7462
- IC65 7463
- IC66 7464
- IC67 7465
- IC68 7466
- IC69 7467
- IC70 7468
- IC71 7469
- IC72 7470
- IC73 7471
- IC74 7472
- IC75 7473
- IC76 7474
- IC77 7475
- IC78 7476
- IC79 7477
- IC80 7478
- IC81 7479
- IC82 7480
- IC83 7481
- IC84 7482
- IC85 7483
- IC86 7484
- IC87 7485
- IC88 7486
- IC89 7487
- IC90 7488
- IC91 7489
- IC92 7490
- IC93 7491
- IC94 7492
- IC95 7493
- IC96 7494
- IC97 7495
- IC98 7496
- IC99 7497
- IC100 7498

1. 7400-7498
 2. 7400-7498
 3. 7400-7498
 4. 7400-7498
 5. 7400-7498
 6. 7400-7498
 7. 7400-7498
 8. 7400-7498
 9. 7400-7498
 10. 7400-7498



DIGITAL UNIT (X46-3050-XX) Component side view

M51951BML



FMG1



TC4S81F
TC4SU69F



NJM4658M



SN7404N



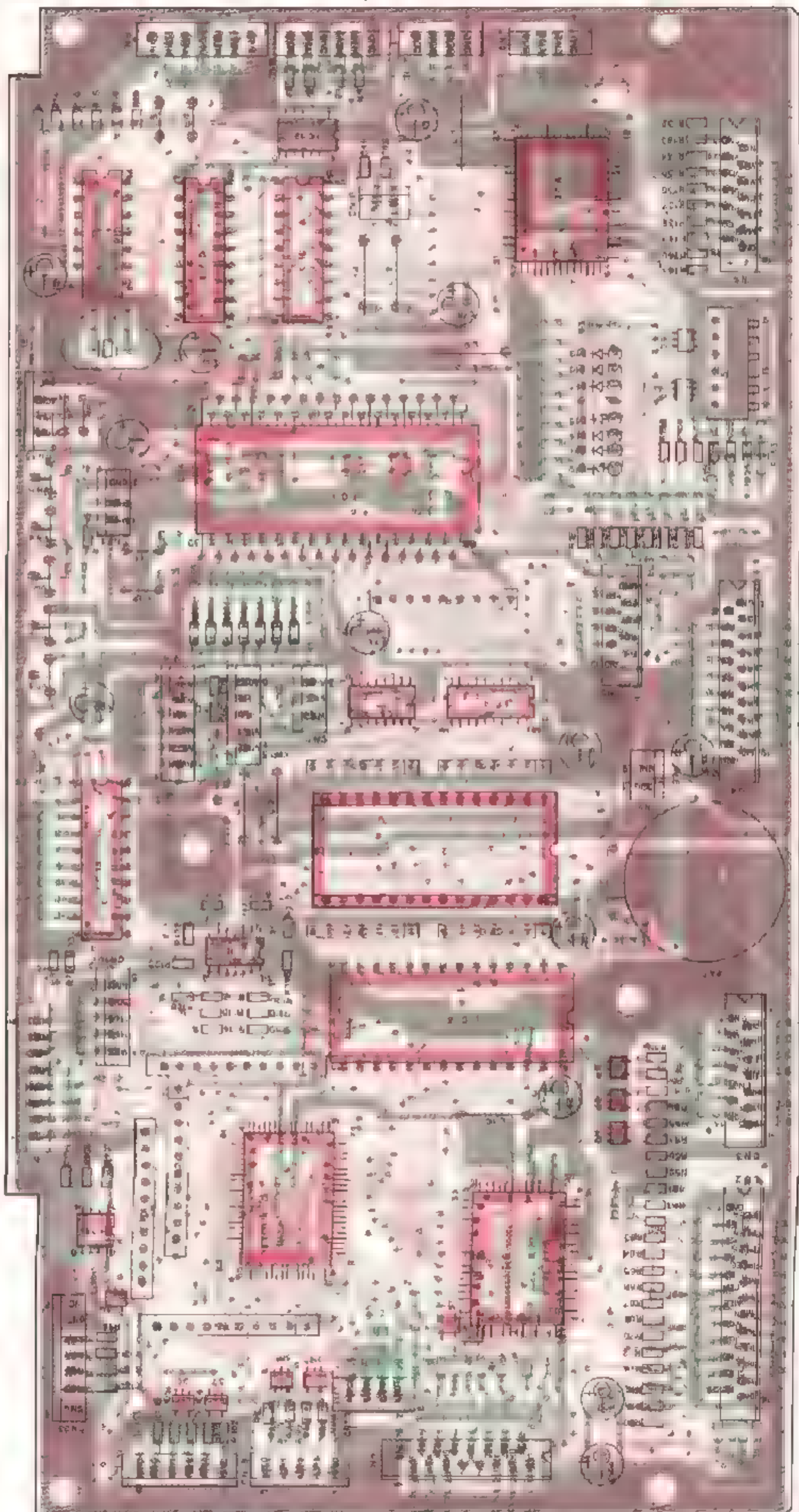
NJM2902M



TC74HC138AF
TC4584BF



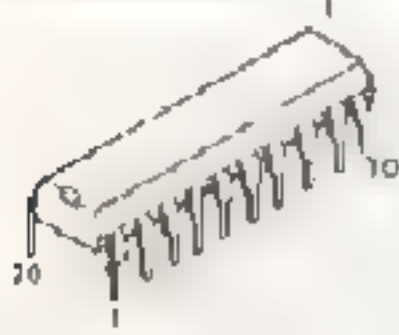
792K37



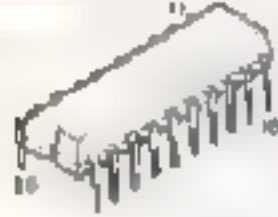
PC BOARD VIEWS TS-950S/SD

DIGITAL UNIT (X46-3050-XX) Foil side view

TC74HC573AF



MB4056



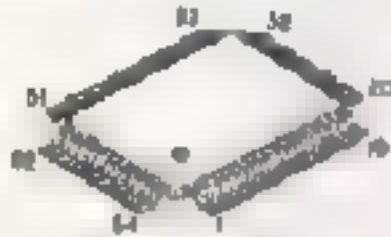
27C256A-25JAW3



TC5564APL-16



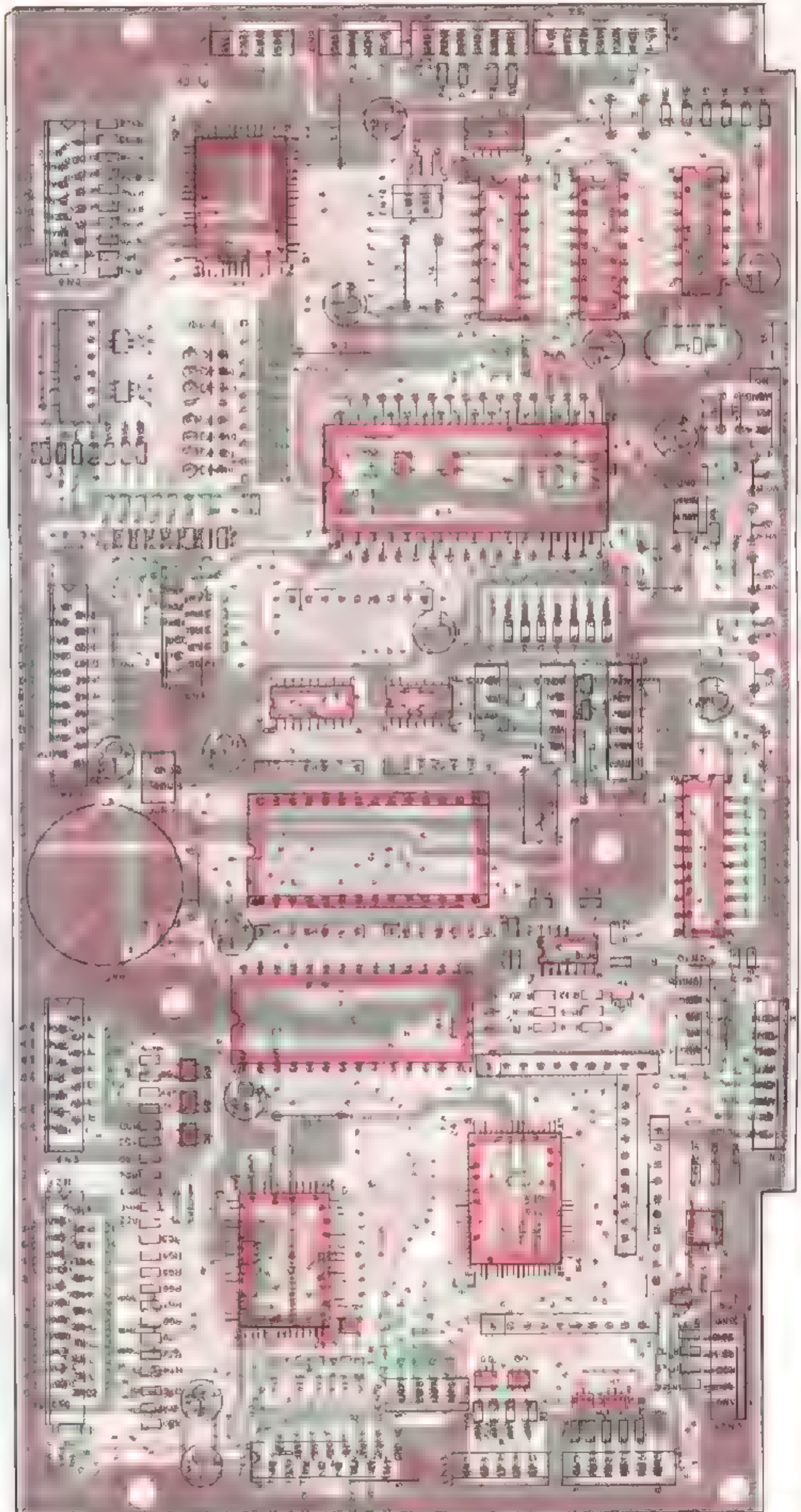
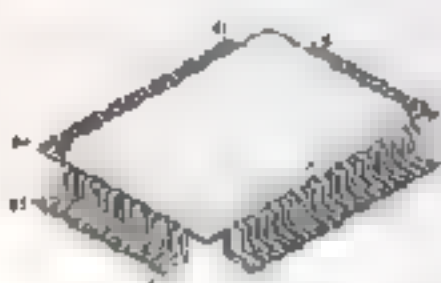
CXD1095Q



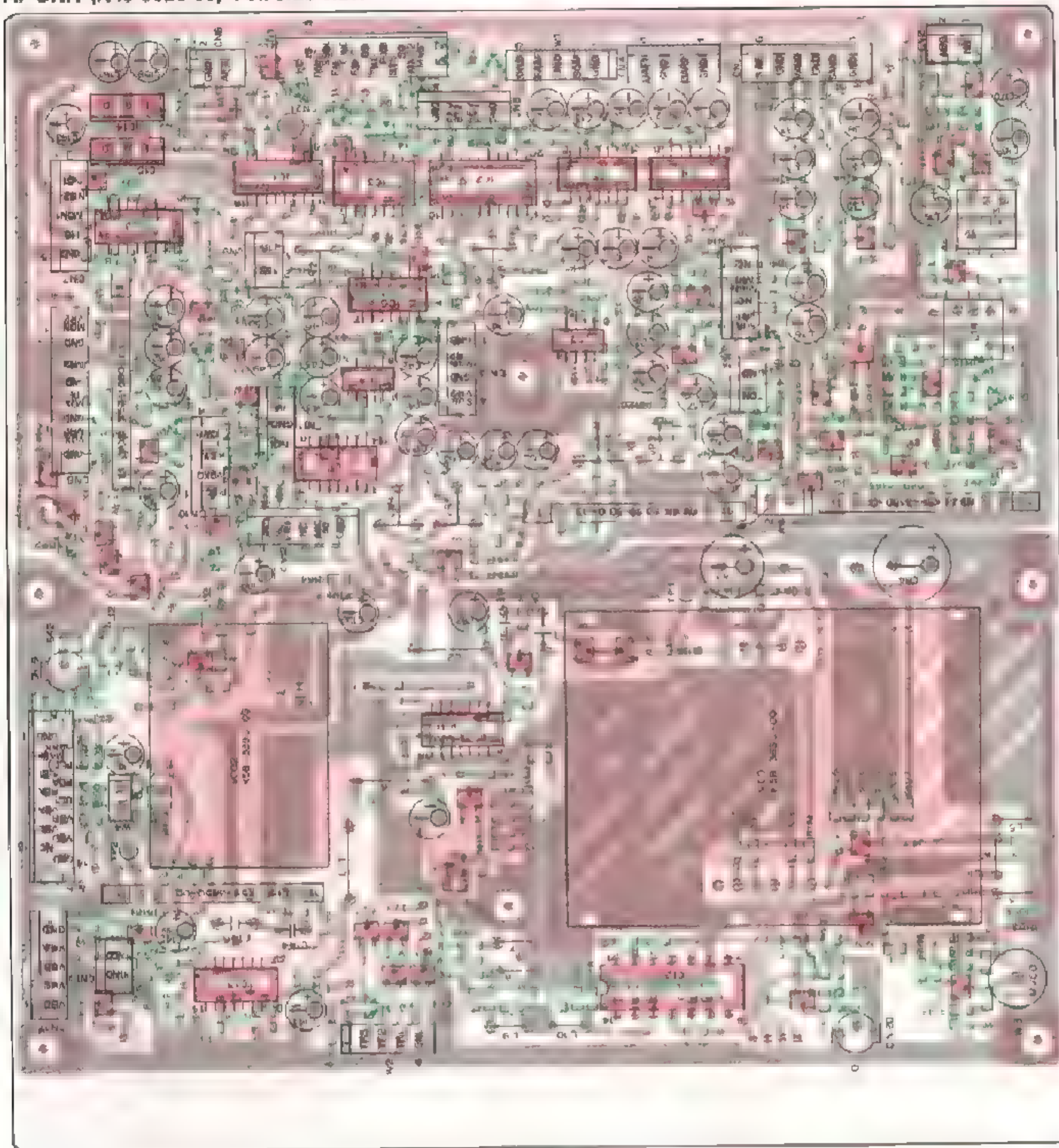
μPD76C10G-38



MB89383B



AF UNIT (X49-3020-00) Foil side view



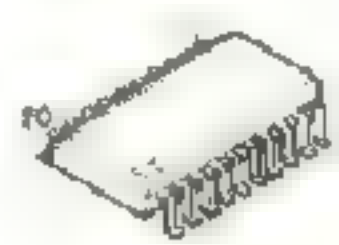
SN76614N



CXD1225M

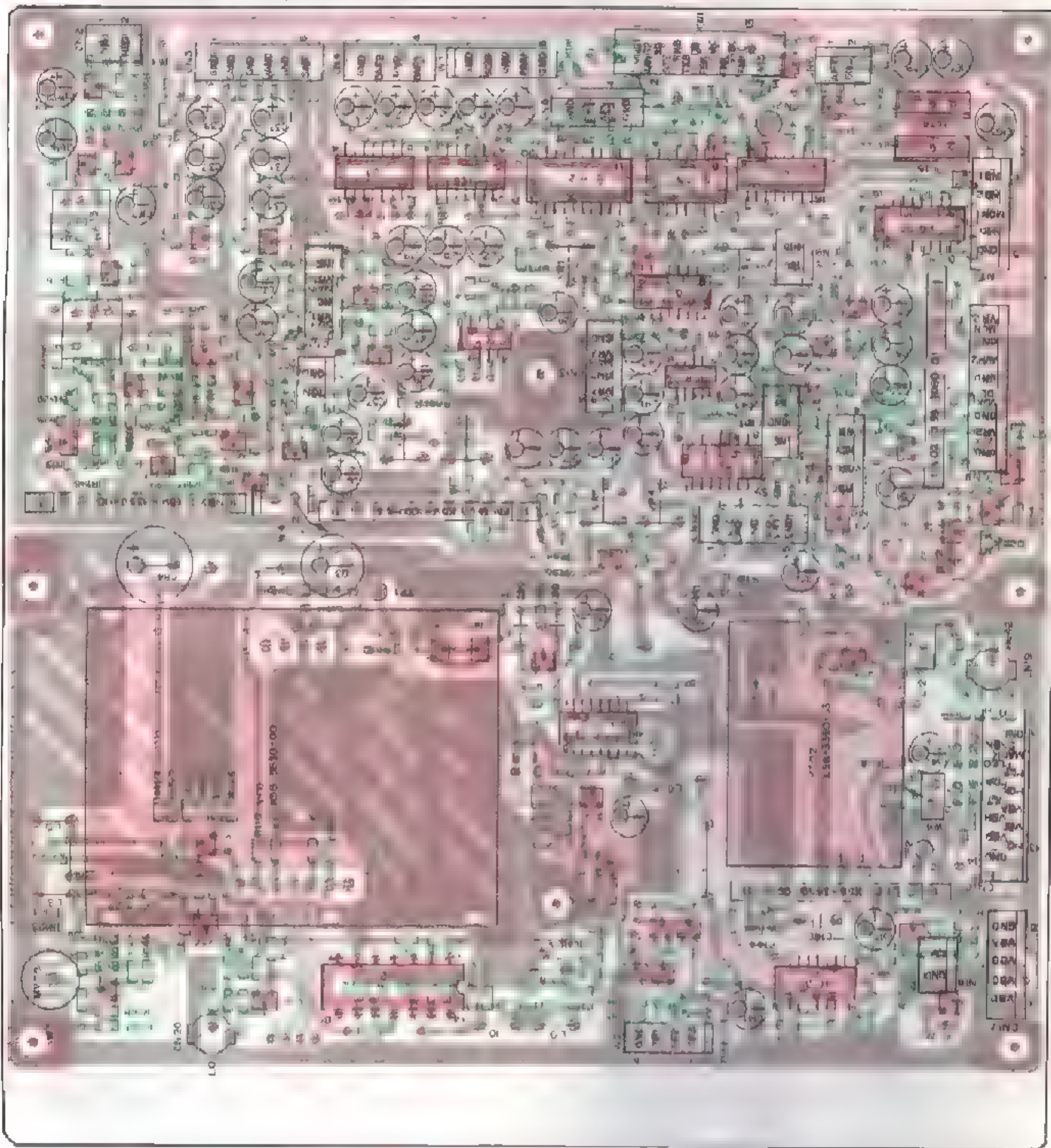
MF5CCWM
TC4066BFSN74LS390NS
TC4538BF

MF10CCWM



TS-950S/SD PC BOARD VIEWS

AF UNIT (X49-3020-00) Component side view



2SA1162
2SC2712
2SC2714
2SC3324
2SD1757
DTA124EK
DTC114EK
DTC114IK
DTC124EK
DTC114WK
2SC2996

2SK210

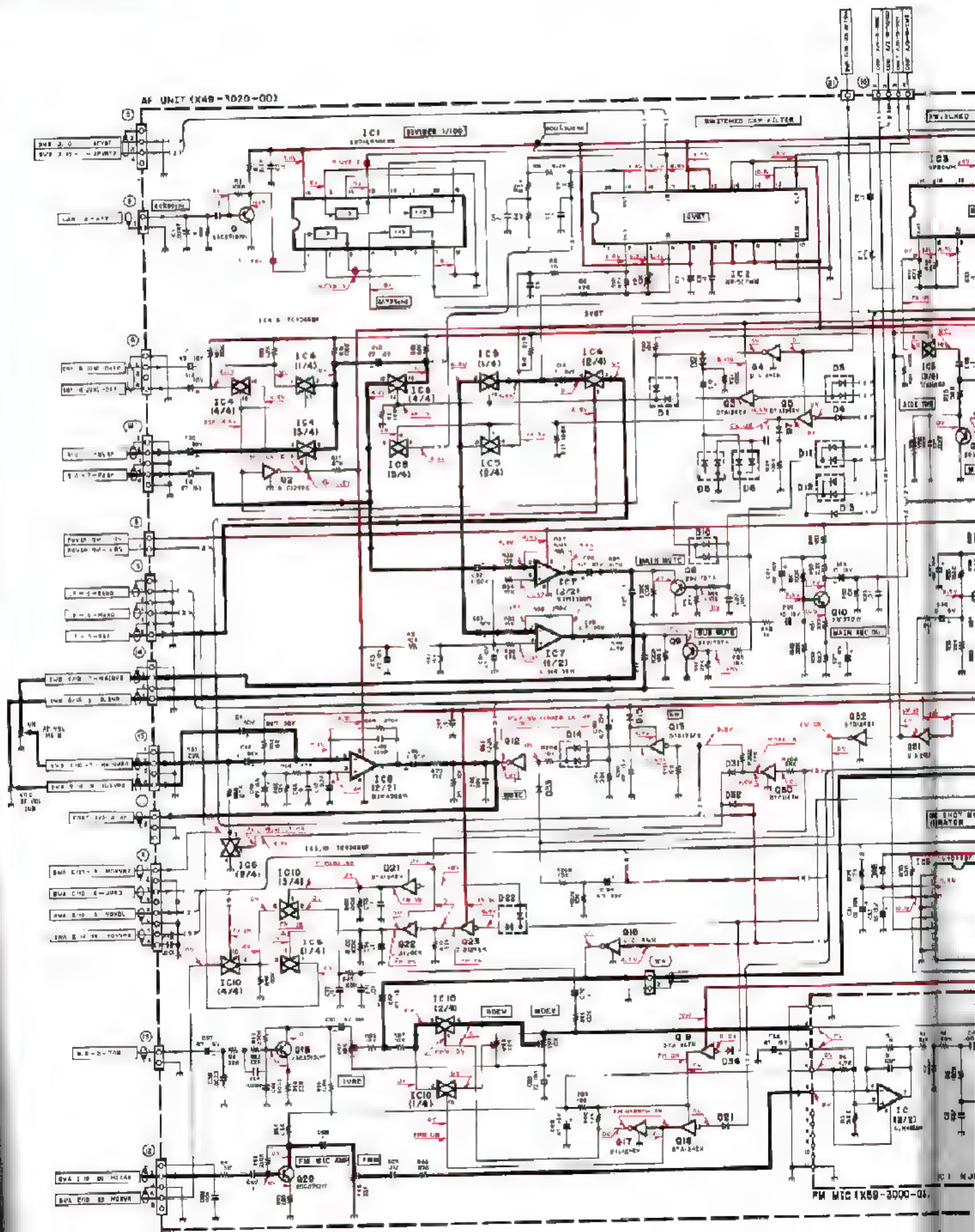
AN78N10

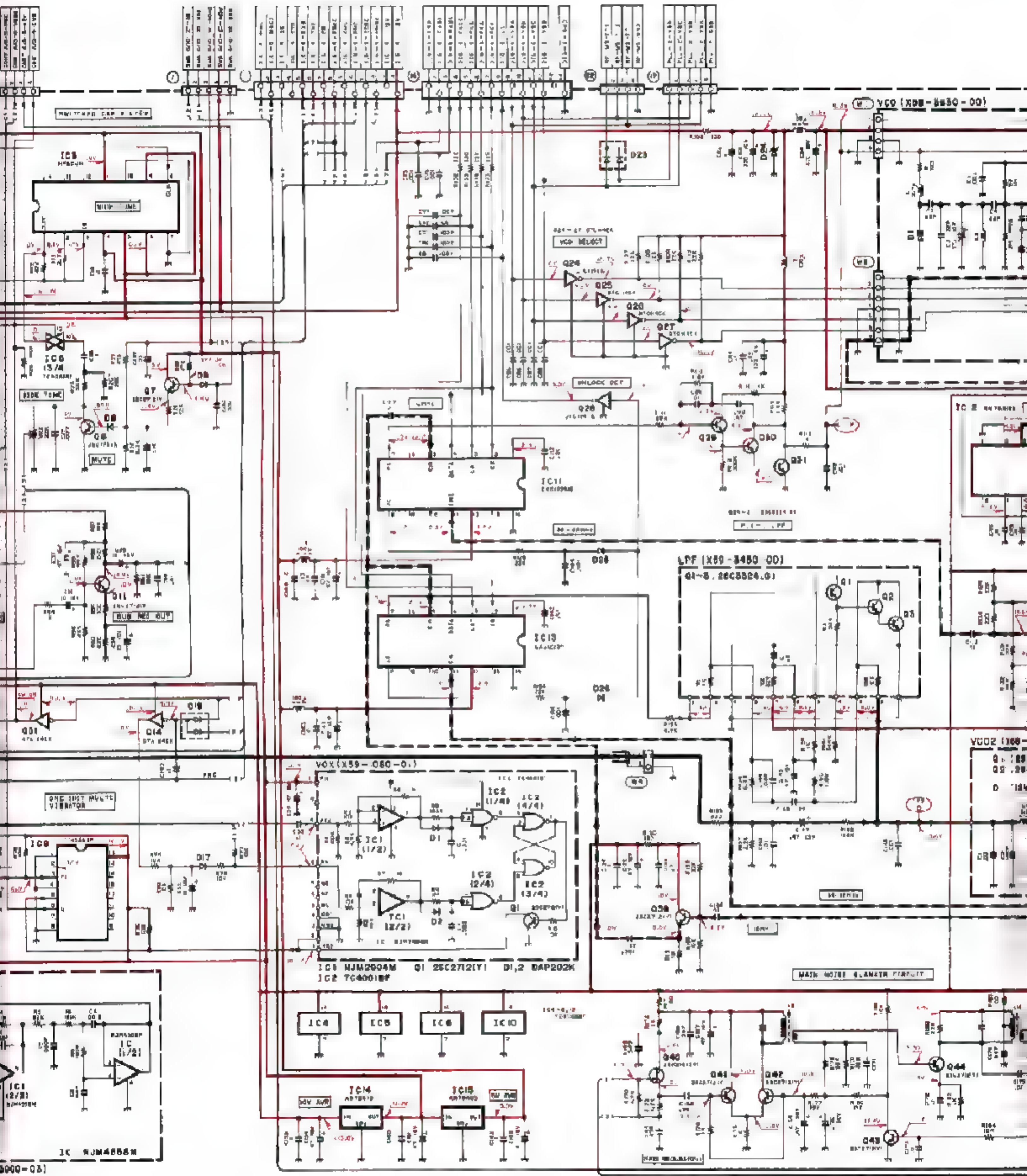
AN78N05

NJM4558M



AF UNIT (K4B-7020-00)





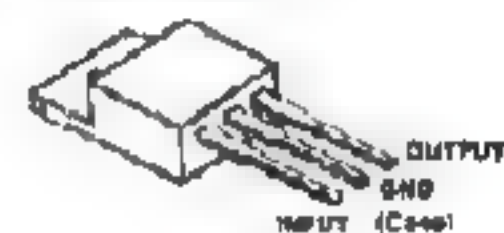
25C2712
25C2714
DTC114EK
DTC114TK



25C2996



AN78M08H
μPC78M08H



SN16013P



M54459L



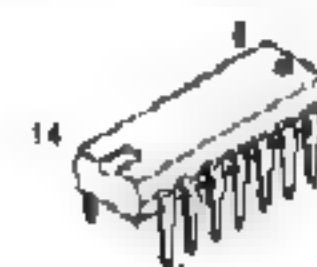
MB467



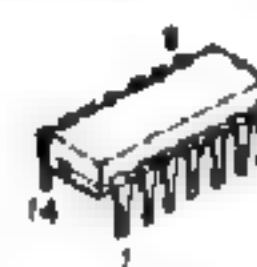
NJM4558SD



SN74LS73AN

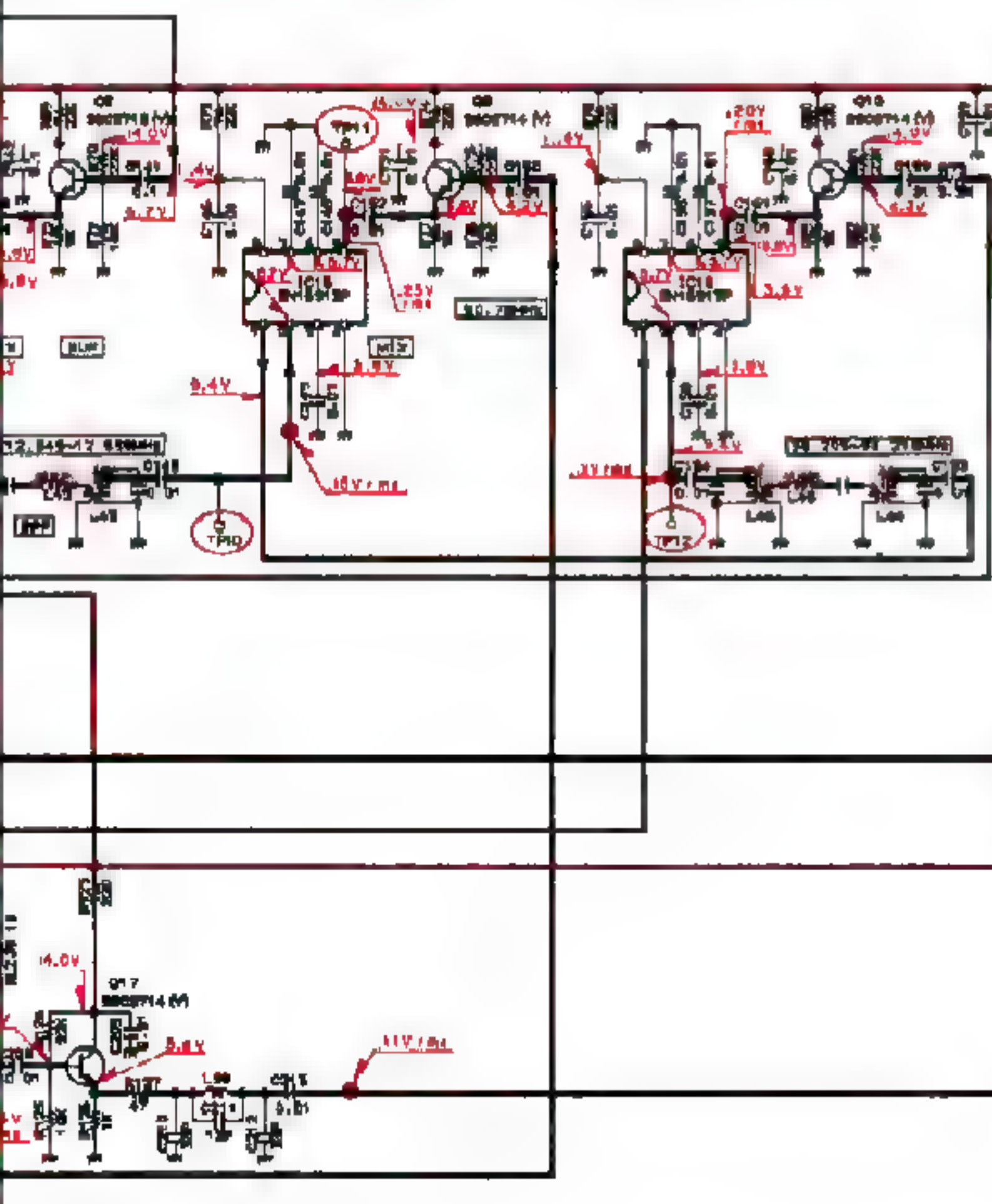


CX 7925B



Freq : 14,000MHz Mode : USB

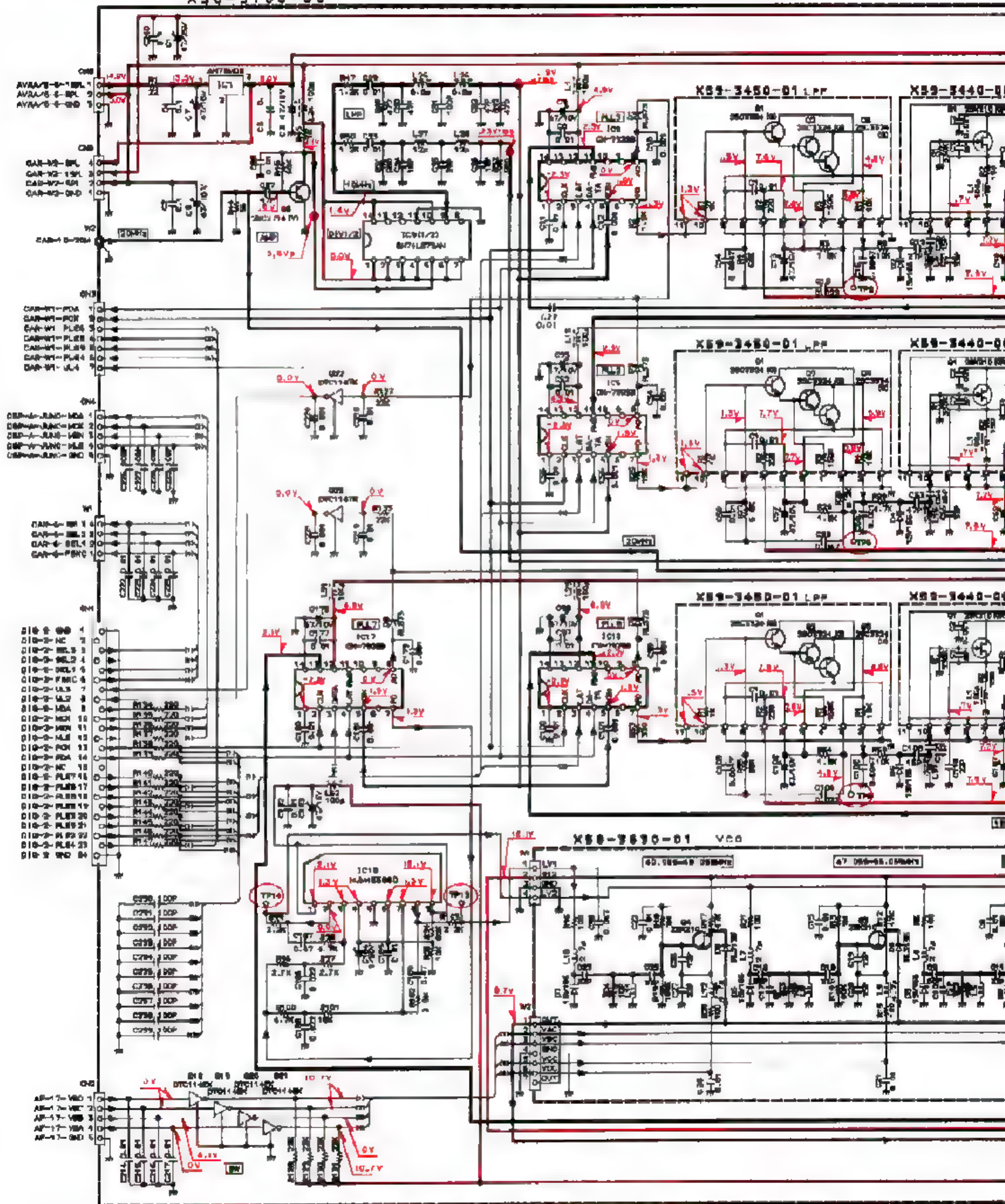
12.4V : DC VOLTAGE
0.24V : SIGNAL LEVEL (Vrms)
4.5Vp : SIGNAL LEVEL (Vp-p)



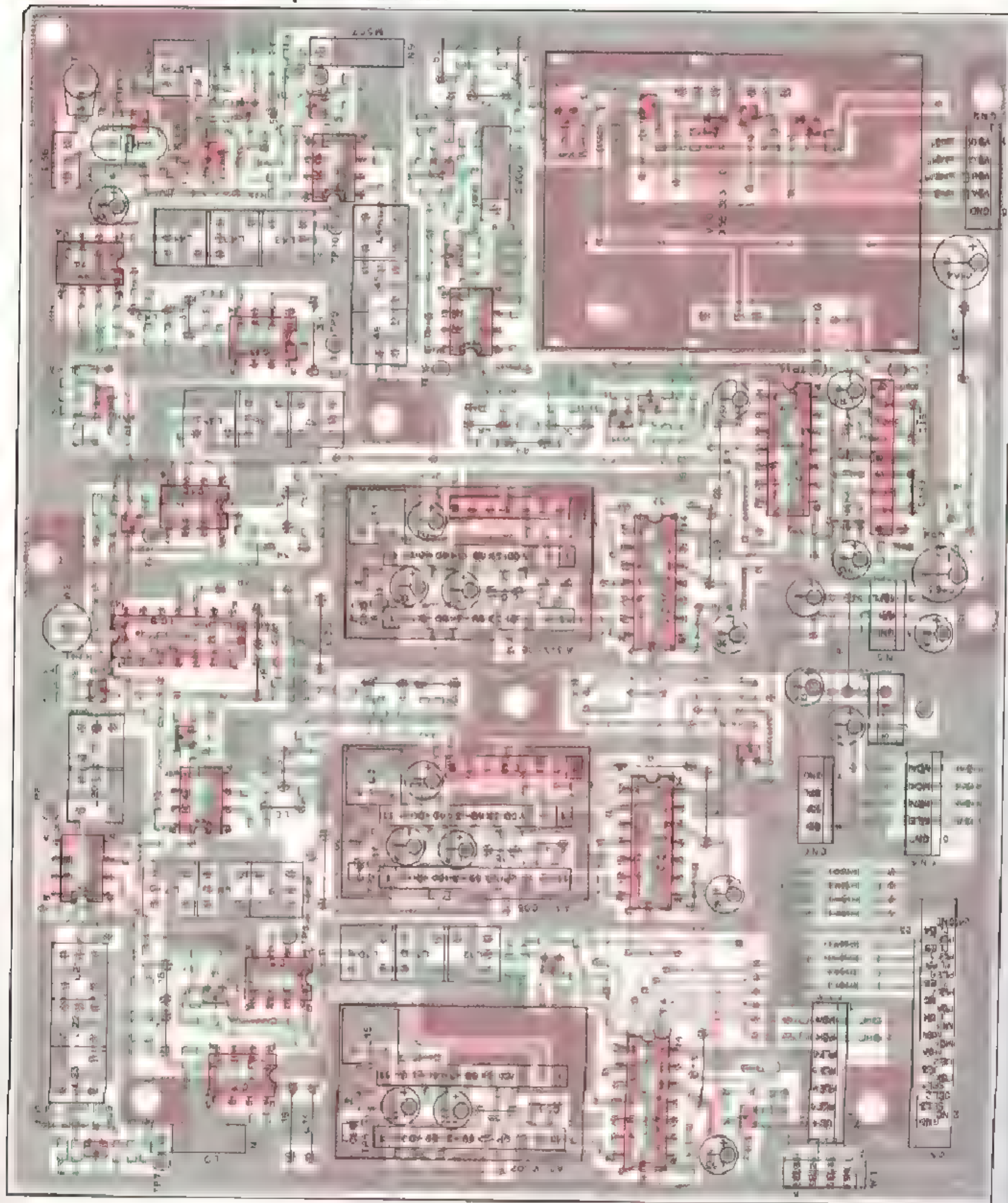
TS-950S/SD CIRCUIT DIAGRAM

PLL UNIT (X50-3100-00)

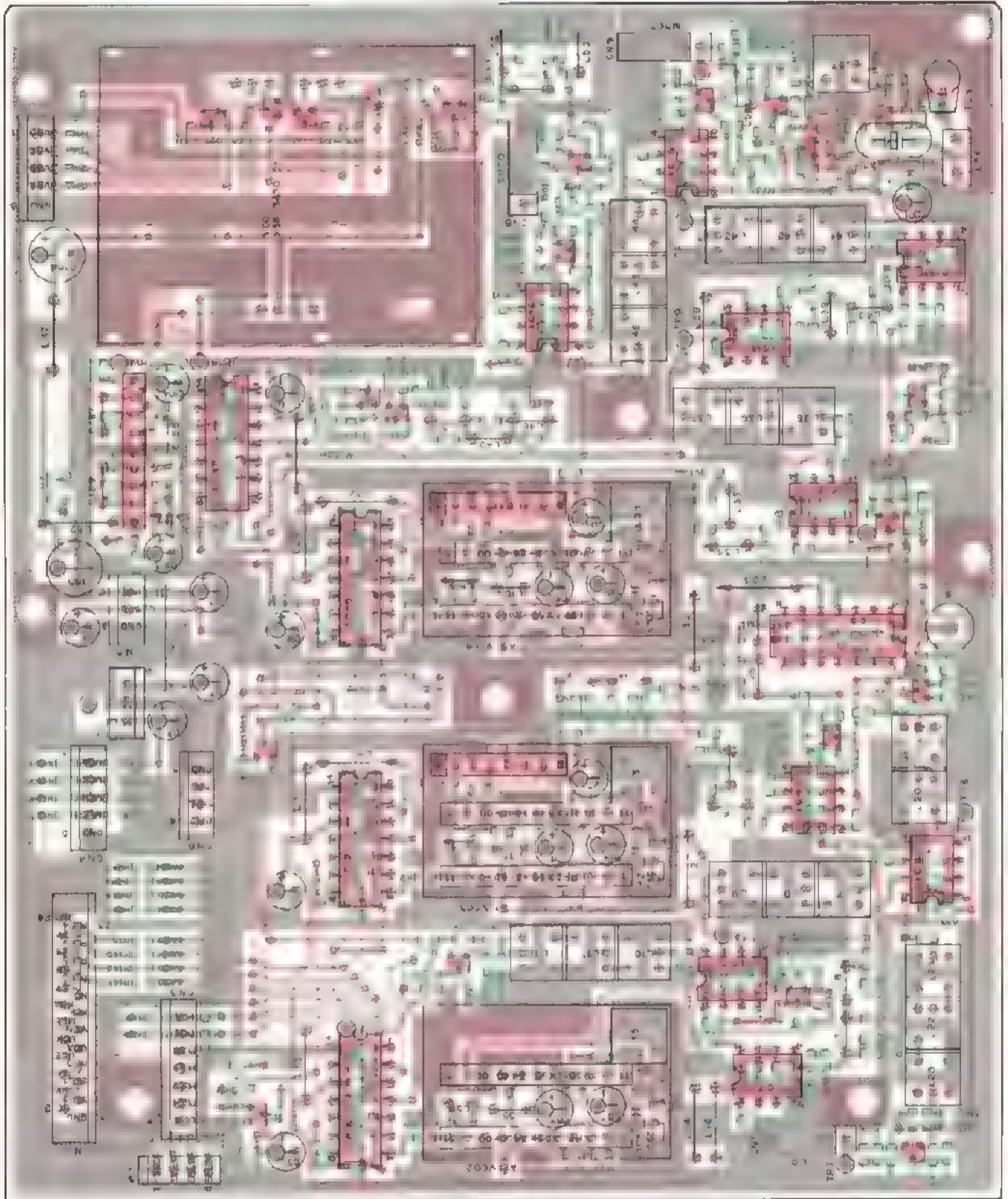
X50-3100-00



PLL UNIT (X50-3100-00) Component side view

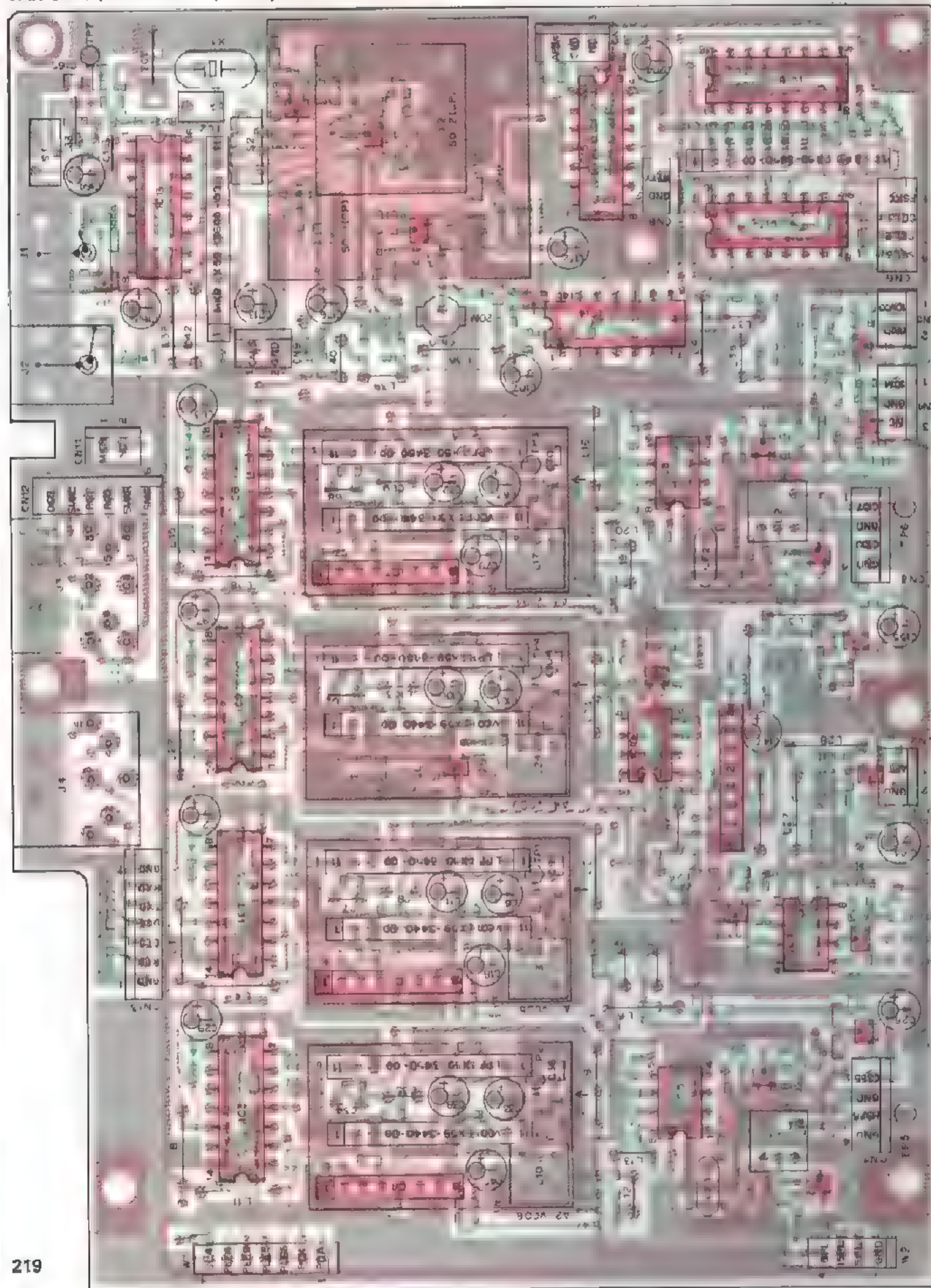


PLL UNIT (X50-3100-00) Foll side view

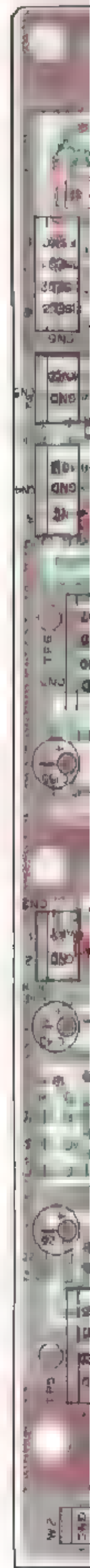


TS-950S/SD PC BOARD VIEWS

CAR UNIT (X50-3110-XX) Component side view

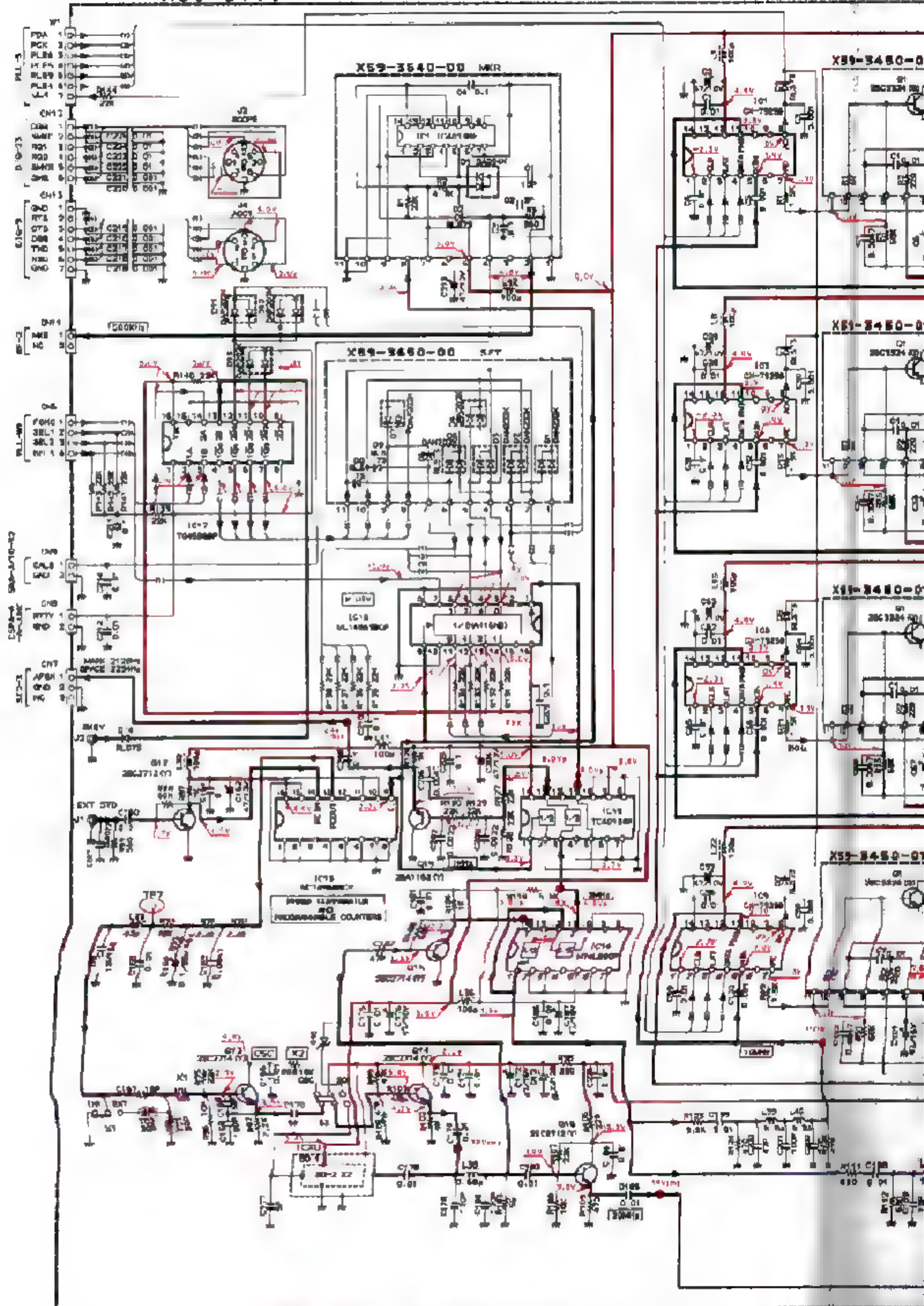


CAR UN

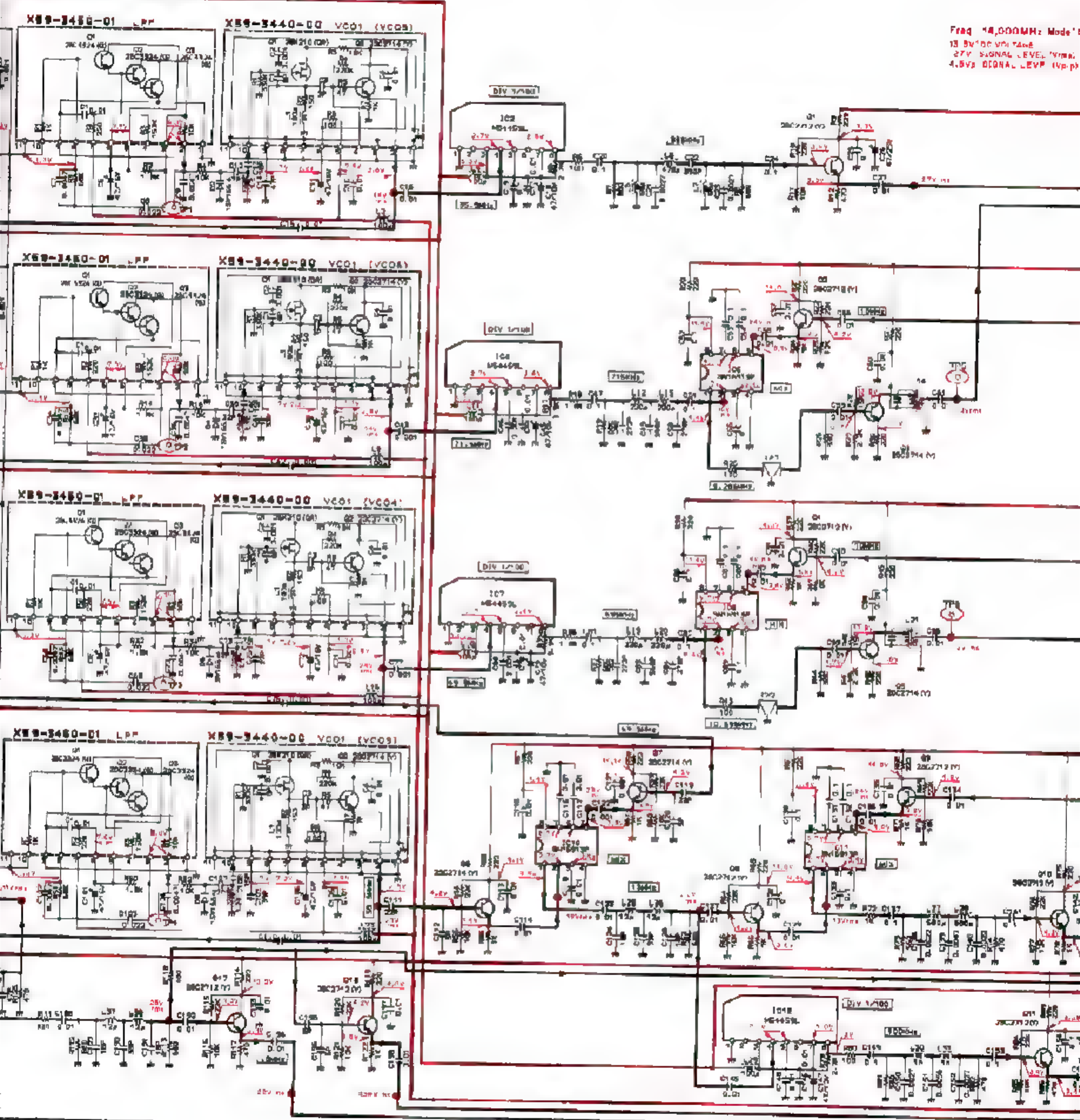


CAR UNIT (X60-3110-XX) -00 : TS-950 -01 : TS-950SD

X50-3110-XX



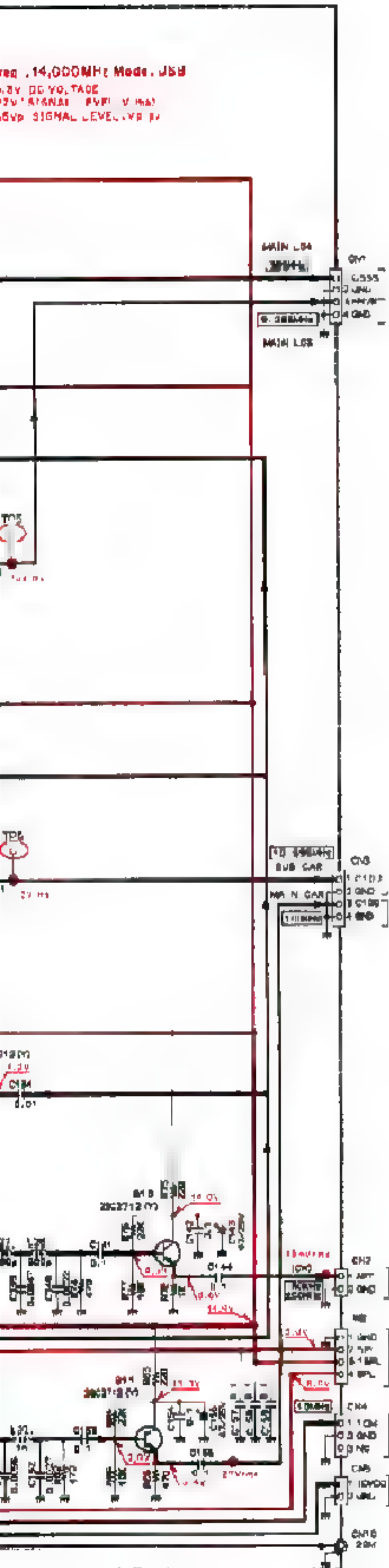
| | | | | |
|--------------|--------------|-------------|----------------------|--------------|
| CK793288 | 1871 具 0 0 | 2823772 (7) | 1971 2 4 00-23 14-00 | 01.13.36 077 |
| 084445 18 | 1872 0 7 12 | 2823714 (7) | 008 00-7 13-00 | |
| 204629 TP | 1873 0 42 44 | 2823702 (7) | 007 00 | |
| MC 1455-0807 | 1874 | | | |
| MC 1455-0808 | 1875 | 01.379 | 1974 5 0 2 14 | |
| MC 1455-0809 | 1876 | 130705 | 022 4 0 0 0 | |
| MC 1455-0810 | 1877 | 02.279 | 008 | |
| TC0-20-0807 | 1878 | 0007202 | 001 00-0 | |



Freq 14,000MHz Mode 1
15.0V DC VOLTAGE
27V SIGNAL LEVEL (Vmax)
4.5V SIGNAL LEVEL (Vmin)

CIRCUIT DIAGRAM TS-950S/SD

req. 14,000MHz Mode. J5B
 1.2V 0.0YQ,TA0E
 1.0V 0.0YQ,TA0E
 1.0V 0.0YQ,TA0E
 1.0V 0.0YQ,TA0E



2SA1162
 2SC2712
 2SC2714



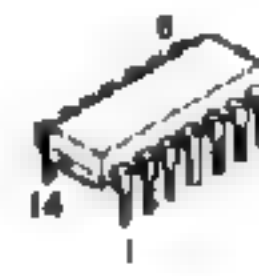
TC4013P



SN16913P



CX-7925B



M54459L



MC14568BCP
 MC14568BCP



M74LS90P
 SN74LS90N

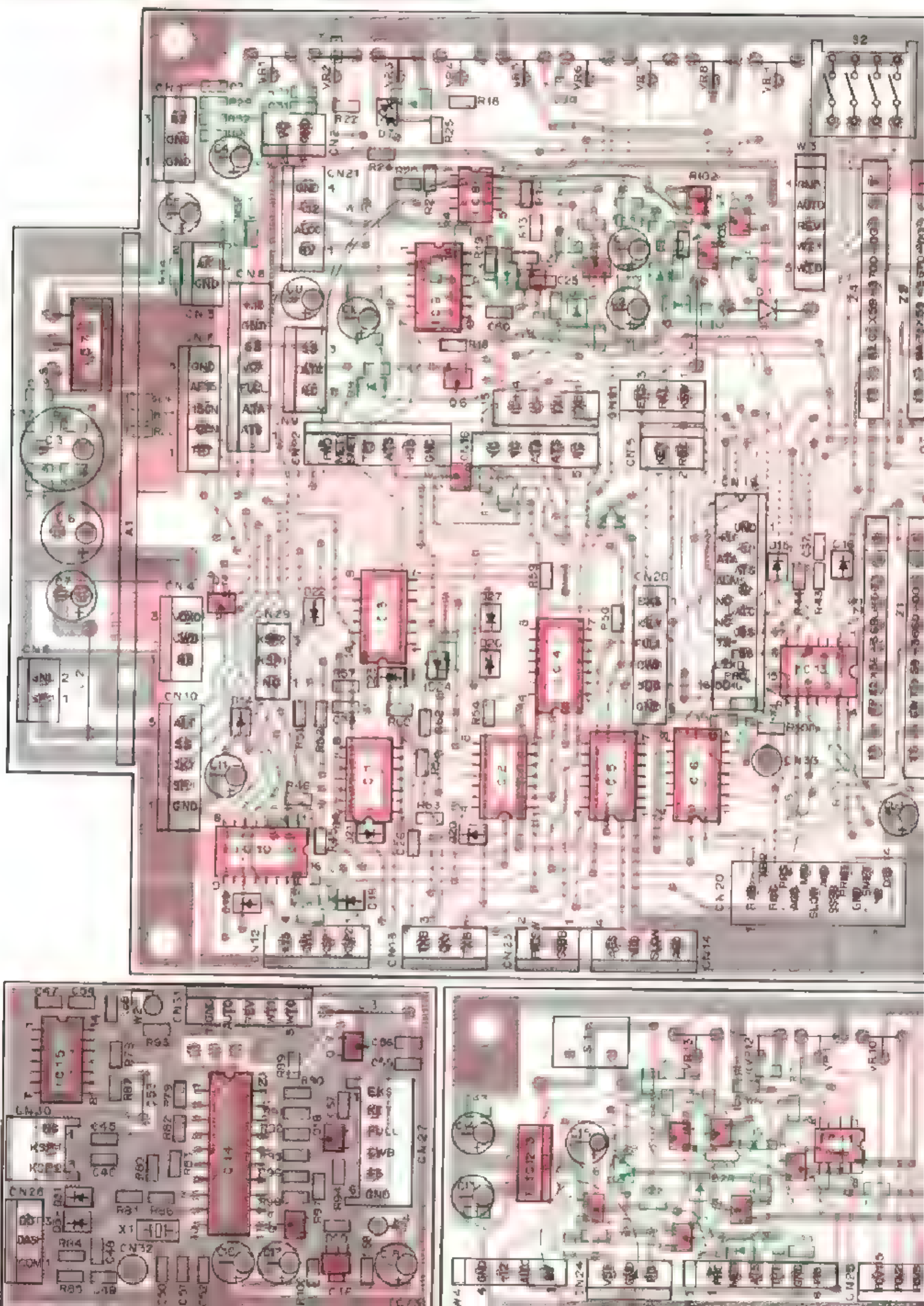


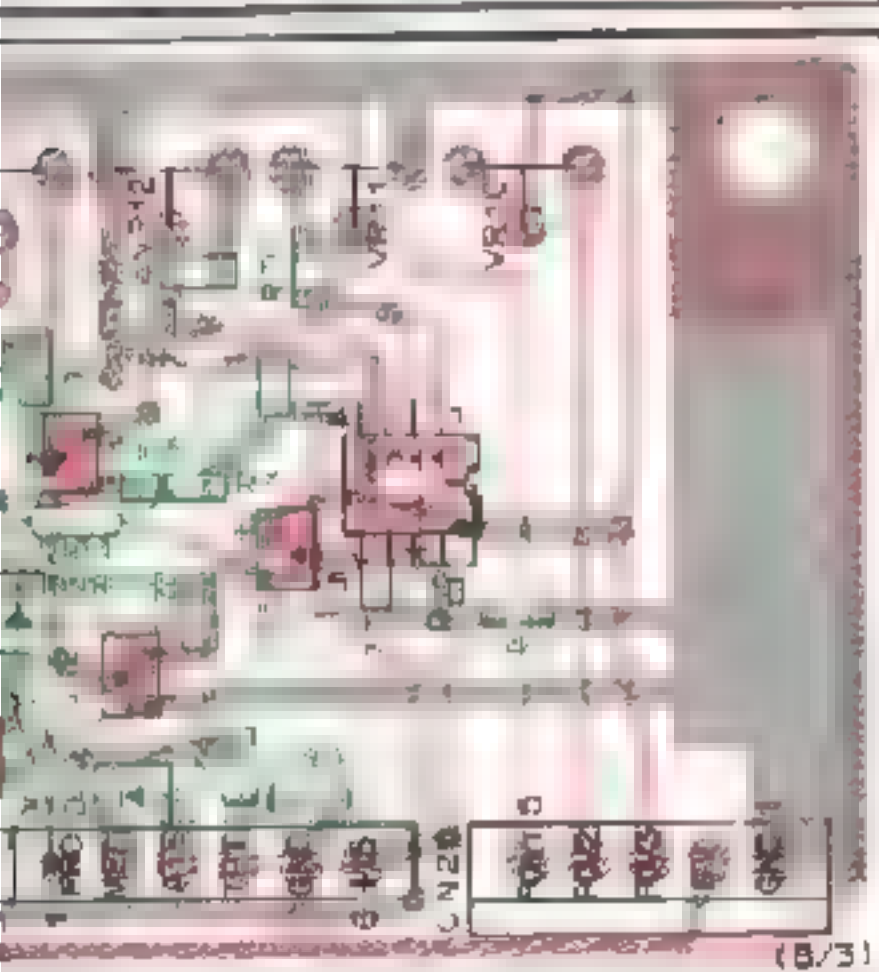
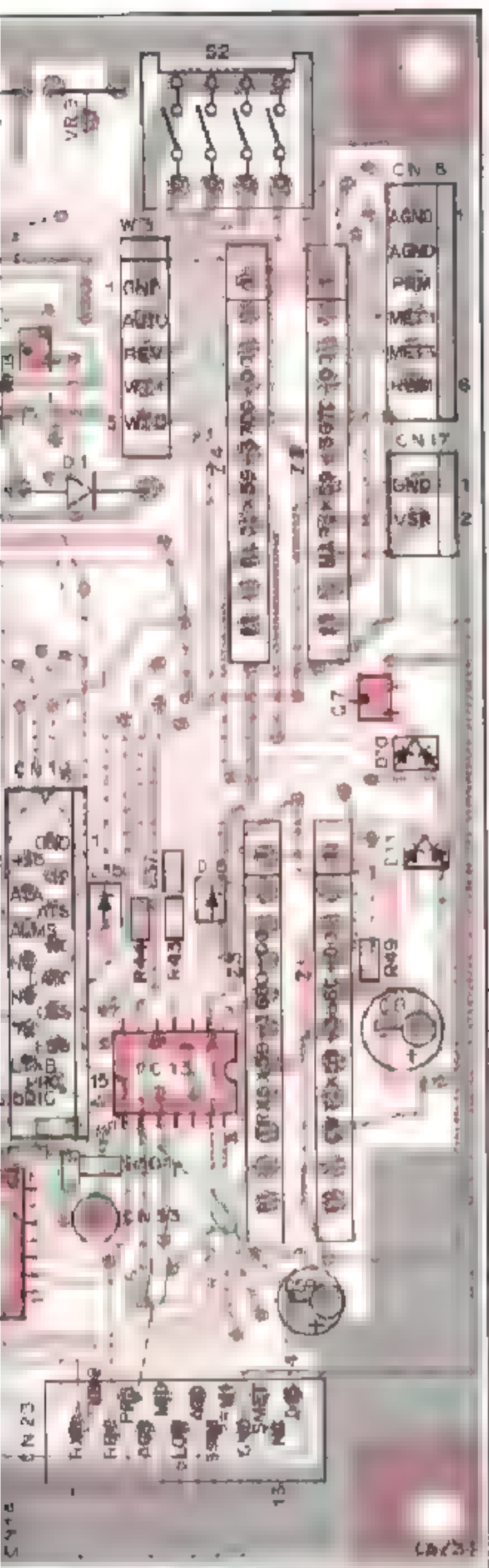
TC45568P

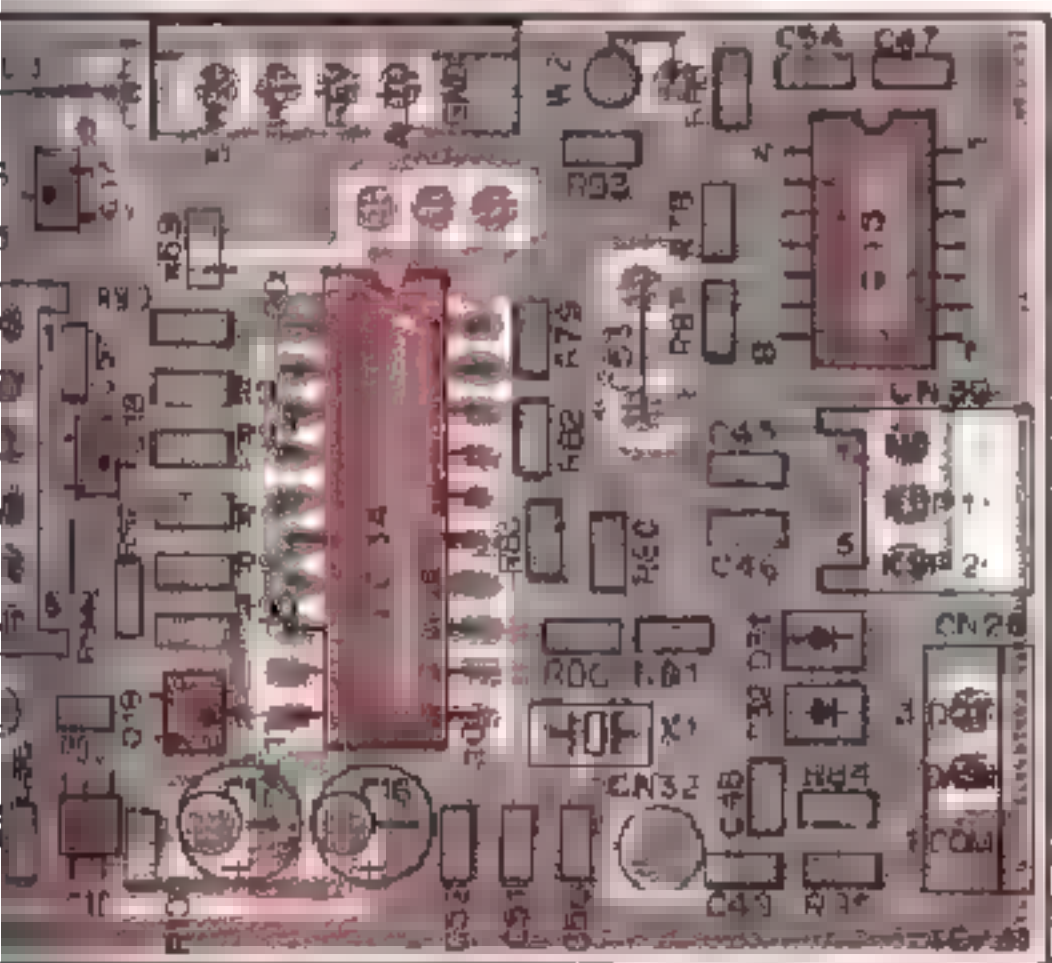
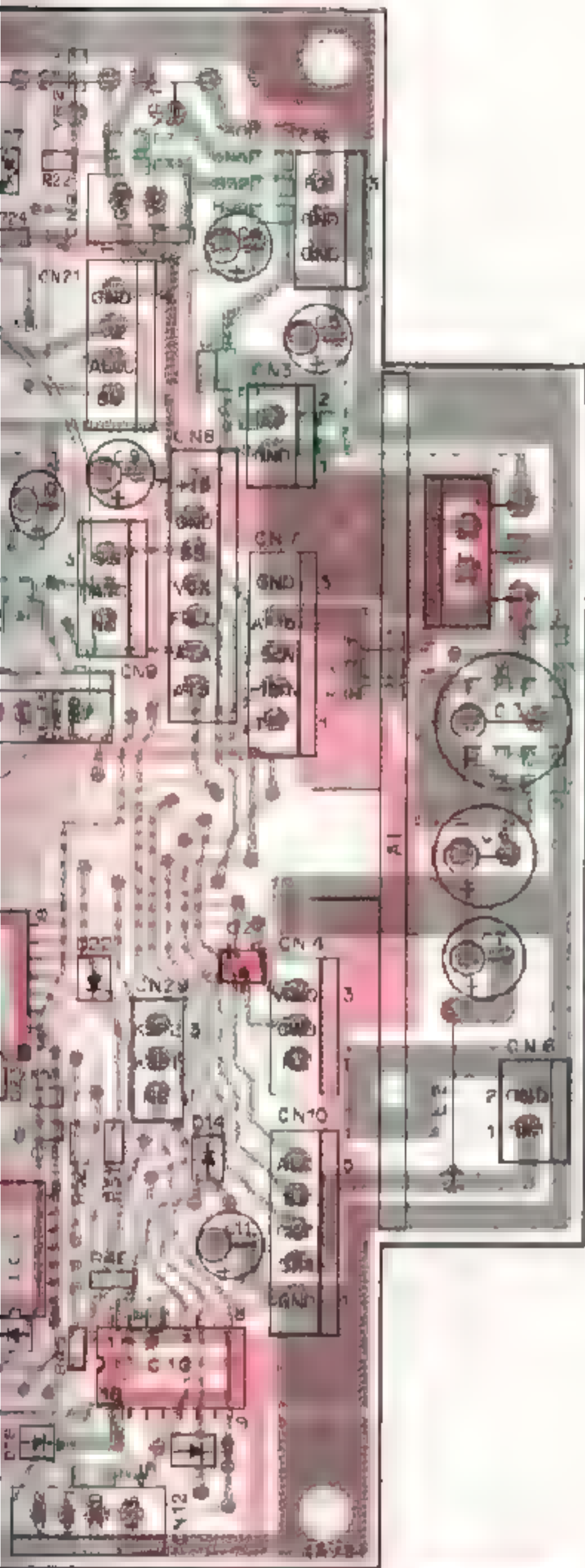


TS-950S/SD PC BOARD VIEWS

CONTROL UNIT (X53-3230-00) Component side view







2SC2712
DTA124EK
DTC114TK
DTC124EK
DTC144EK
DTC144WK



2SK208



M519518ML



AN78N08



μPC2002V



NJM4558M



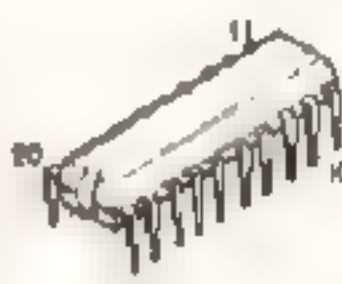
TC4011BF
TC4066BF
TC4069UBF

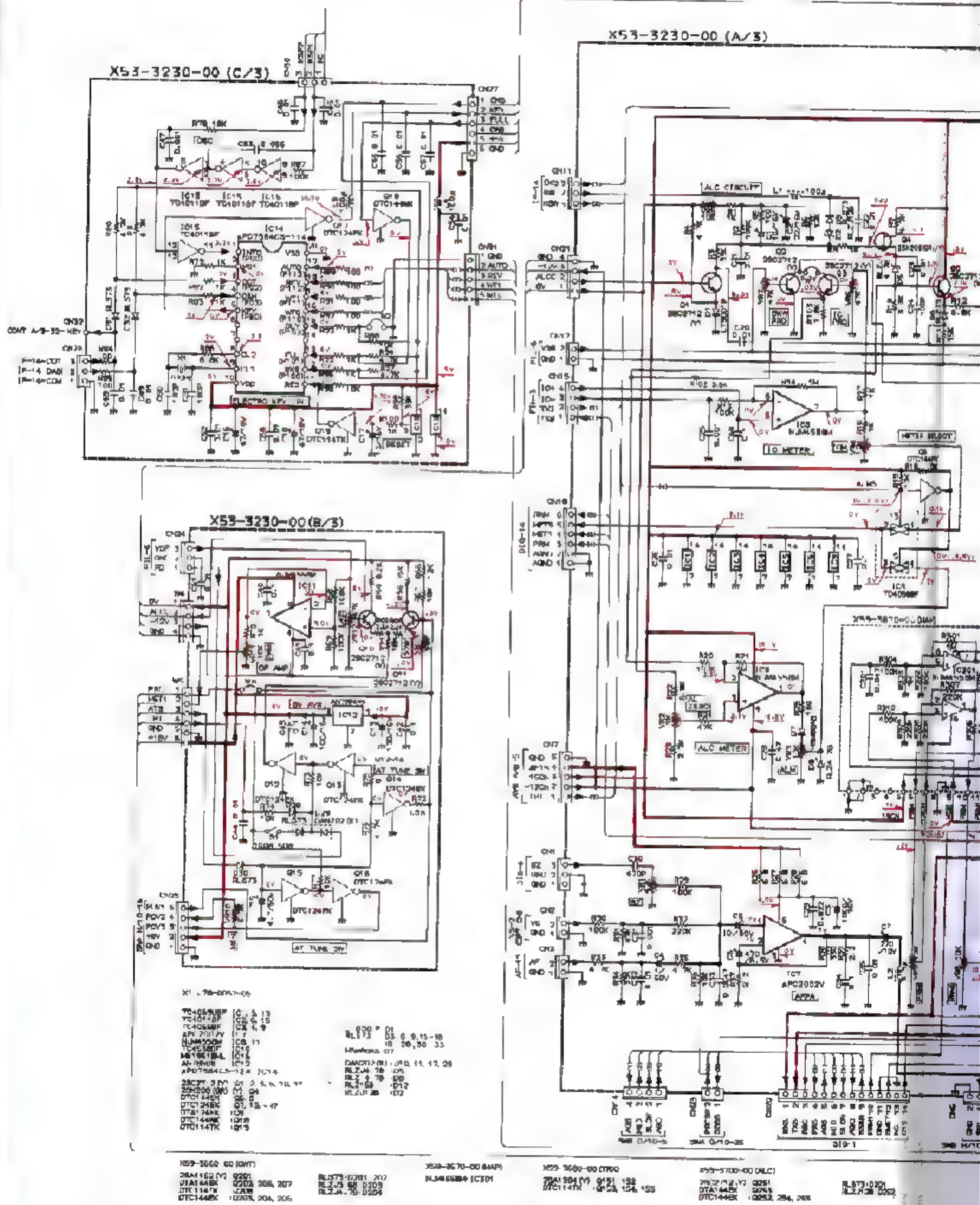


TC4538BF

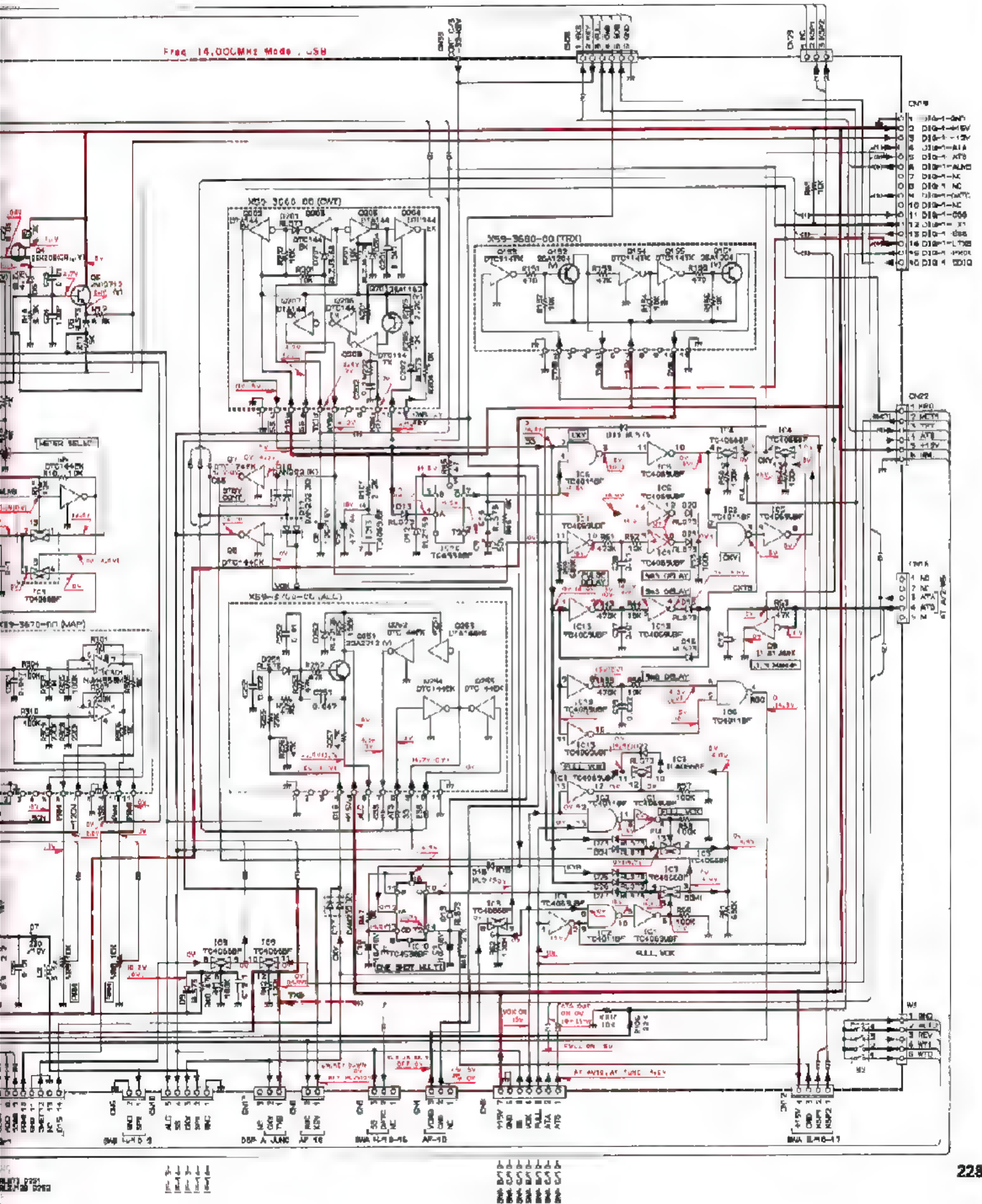


μPD7584CS-114



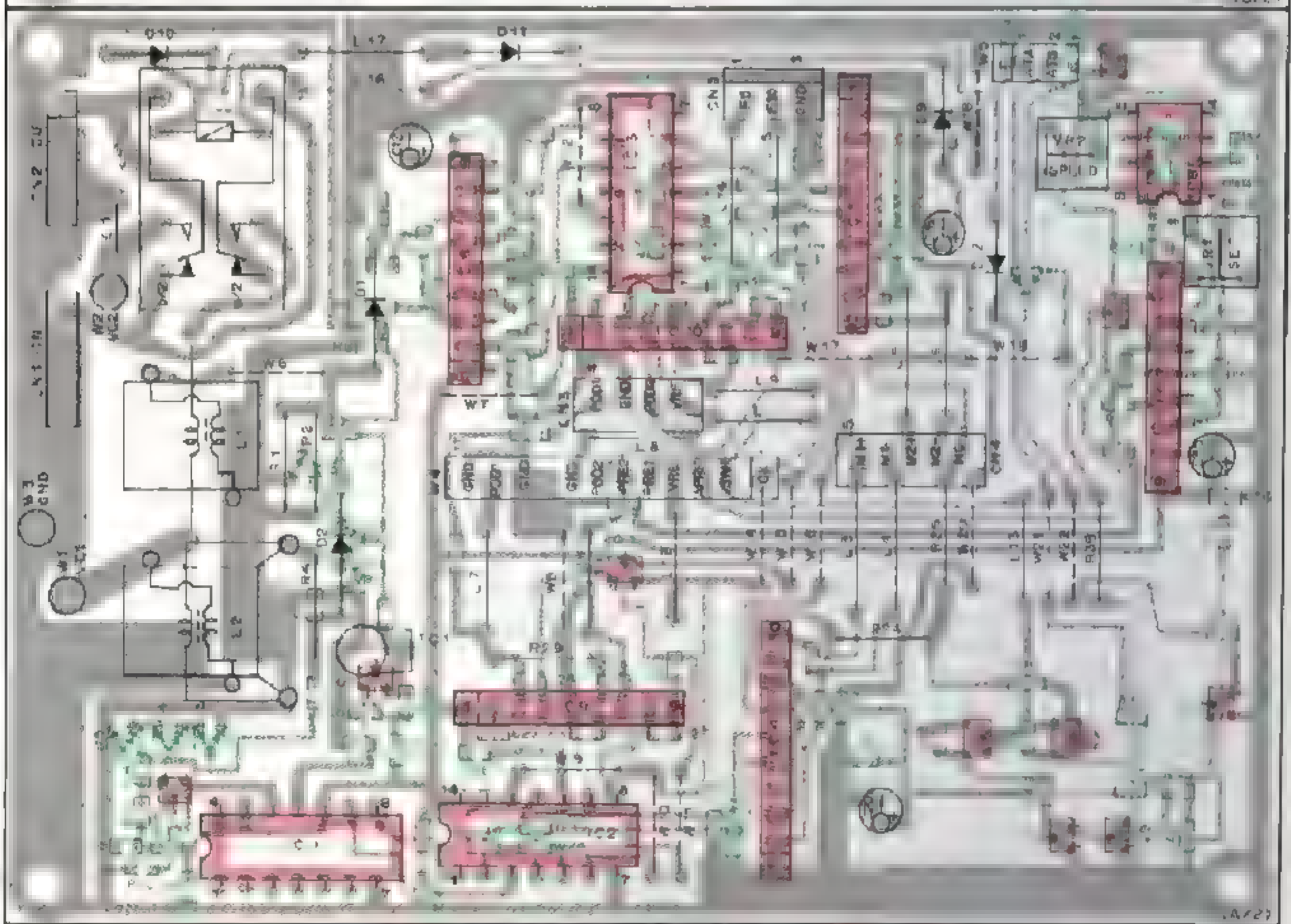
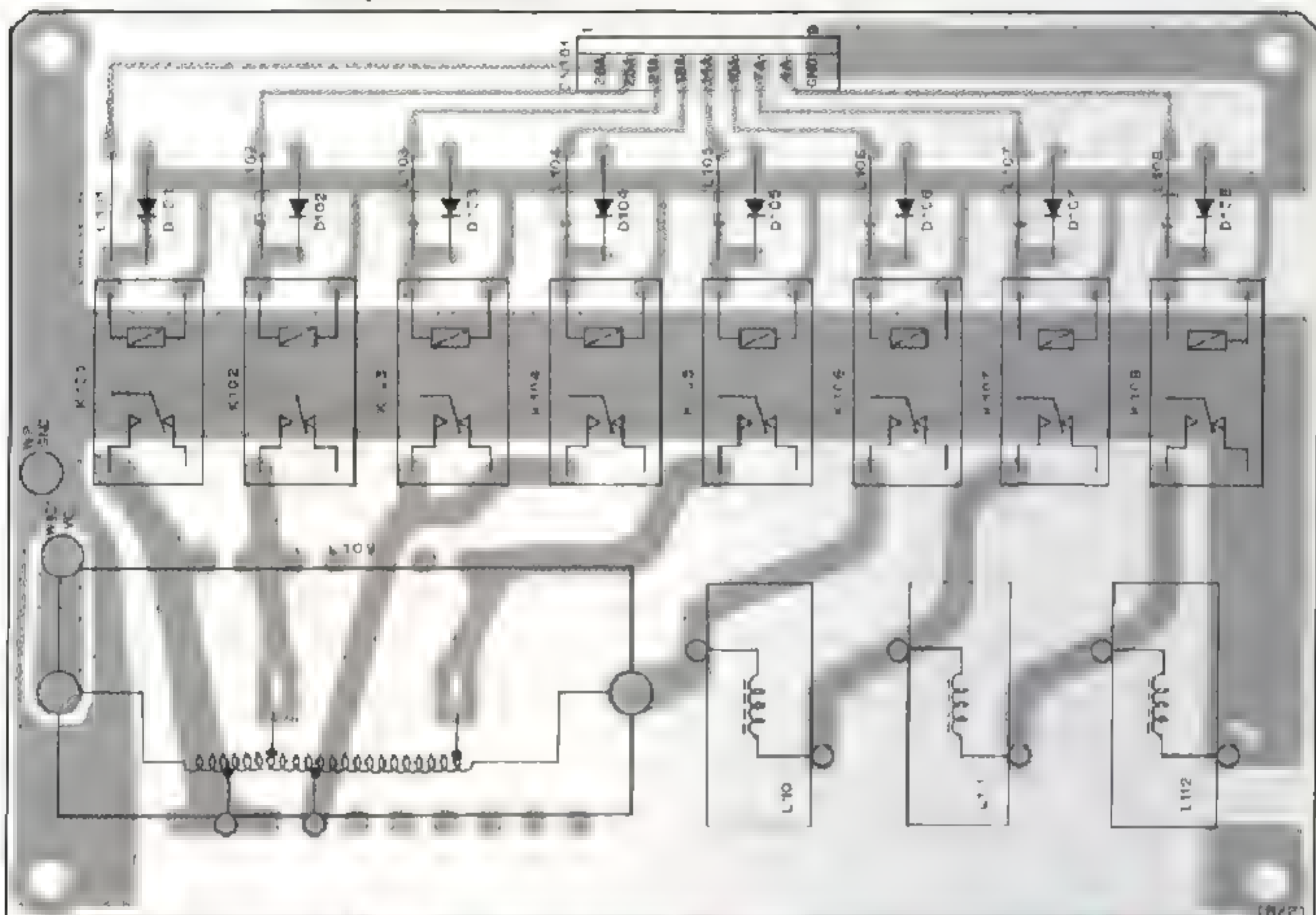
CONTROL UNIT (X53-3230-00)

CIRCUIT DIAGRAM TS-950S/SD

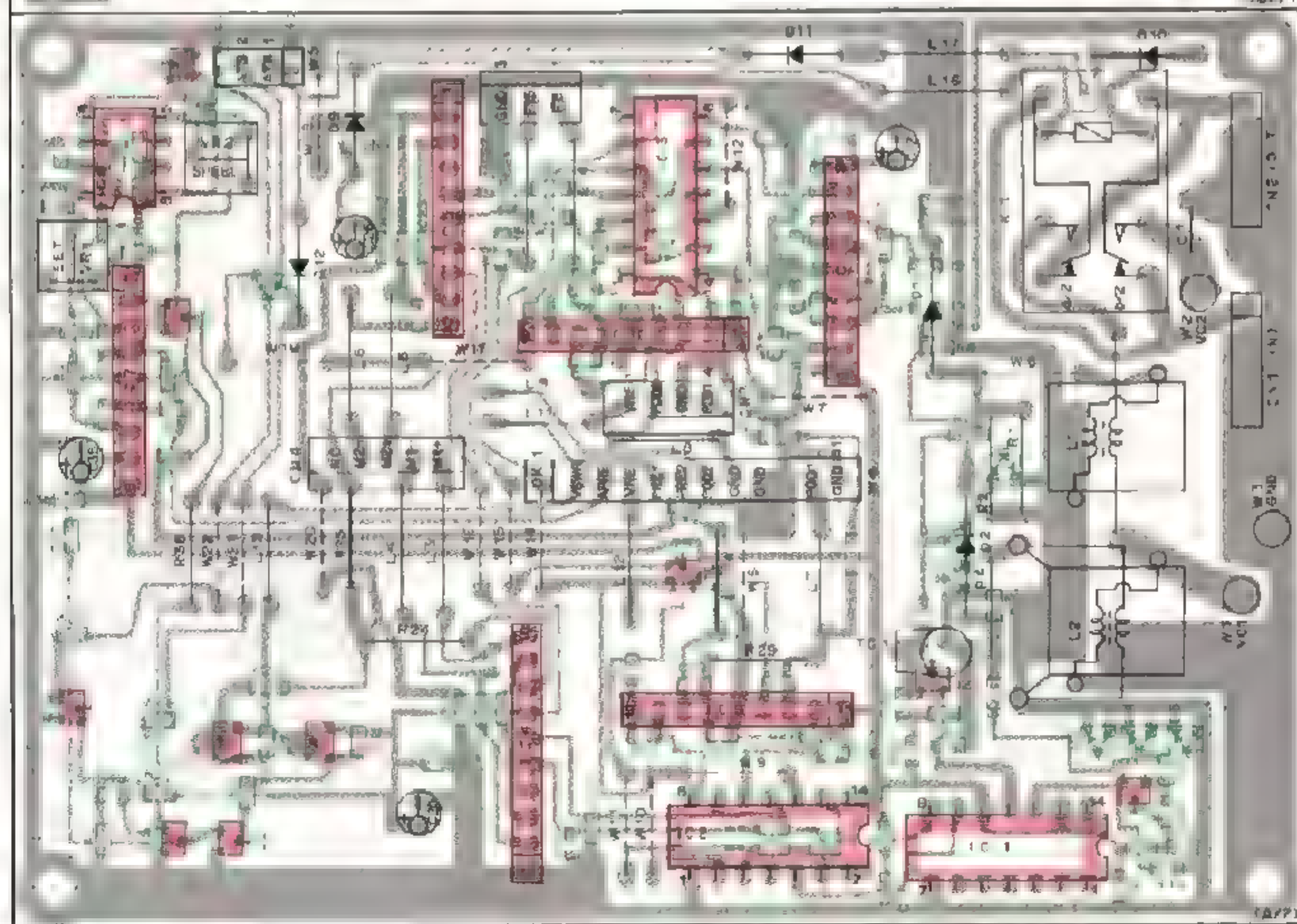
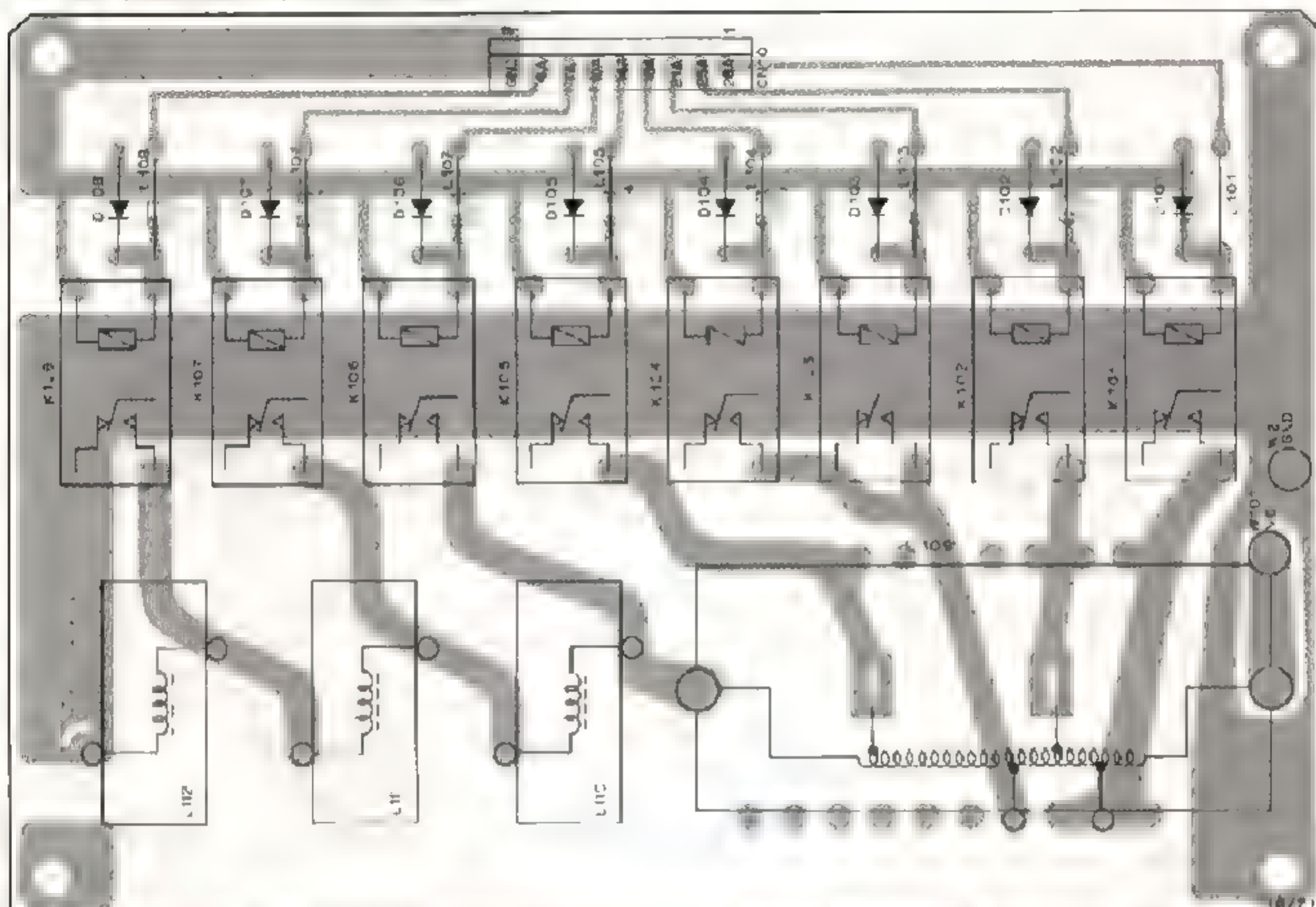


TS-950S/SD PC BOARD VIEWS

AT UNIT (X53-3240-00) Component side view



AT UNIT (X53-3240-00) Foil side view



AT UNIT (X53-3240-00)

2SC2714
DTC114EK



2SA1204



NE555P



NJM2903S
NJM2904S



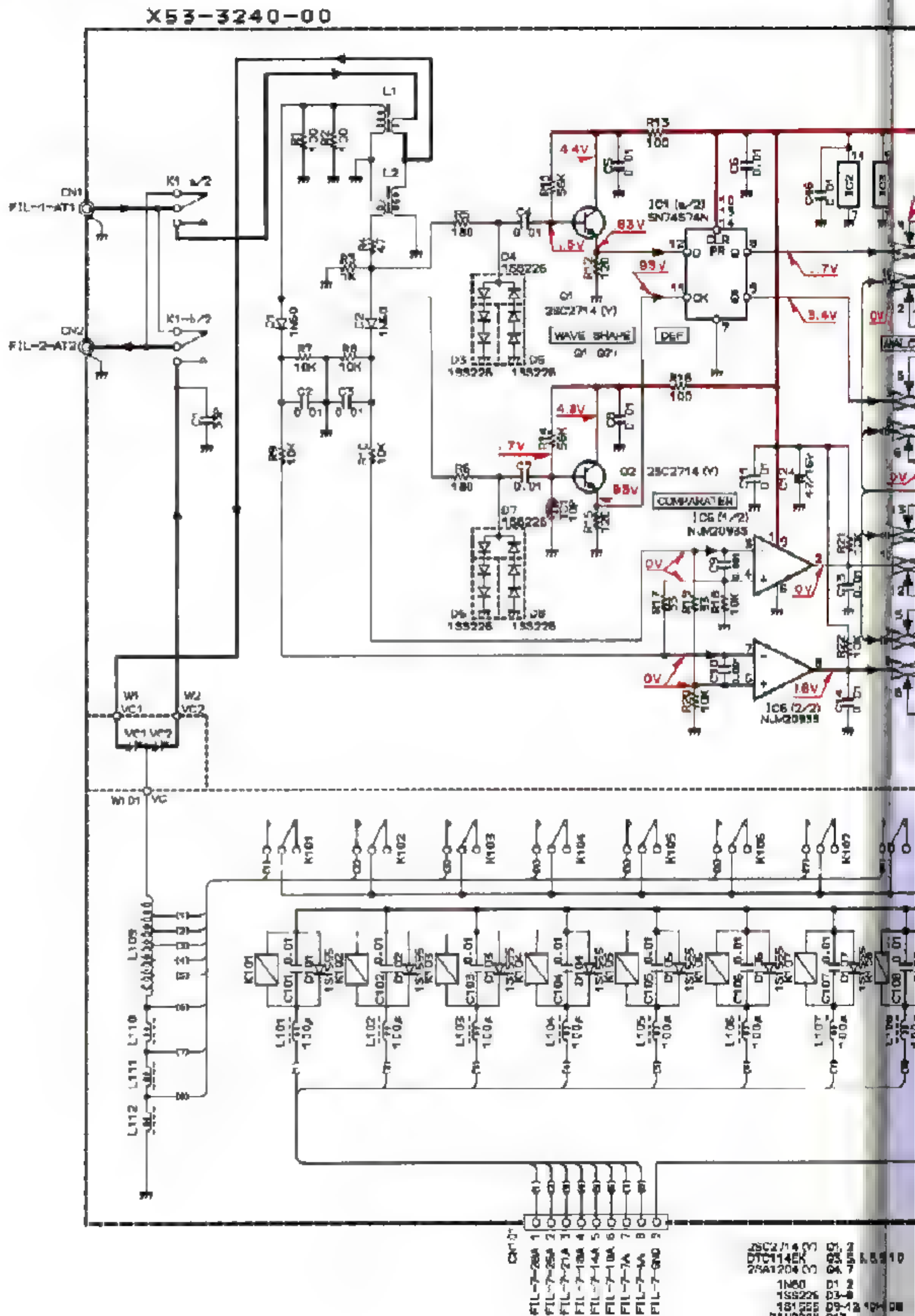
BA6109U2



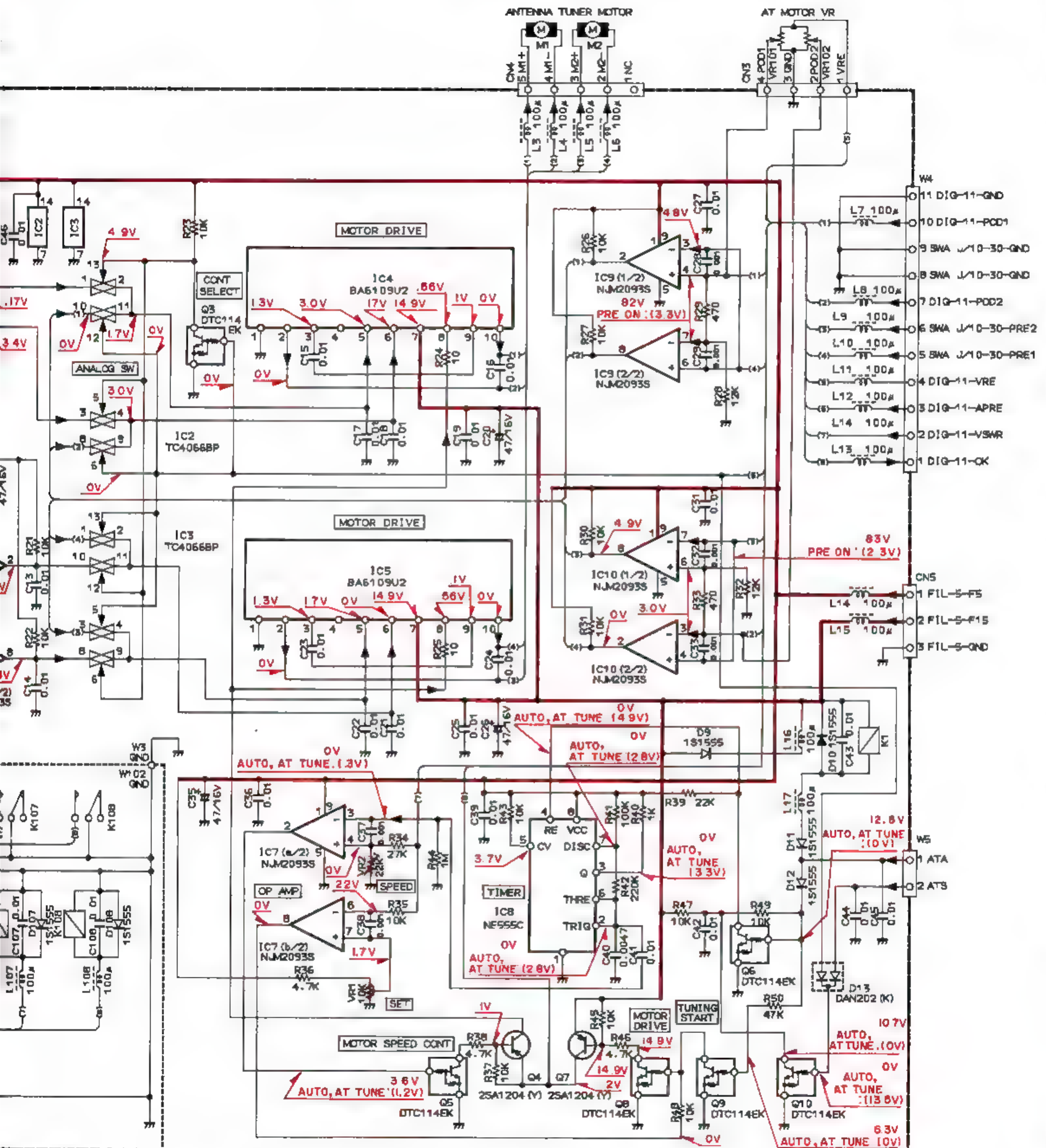
TC4086BP



SN74S74N



CIRCUIT DIAGRAM TS-950S/SD

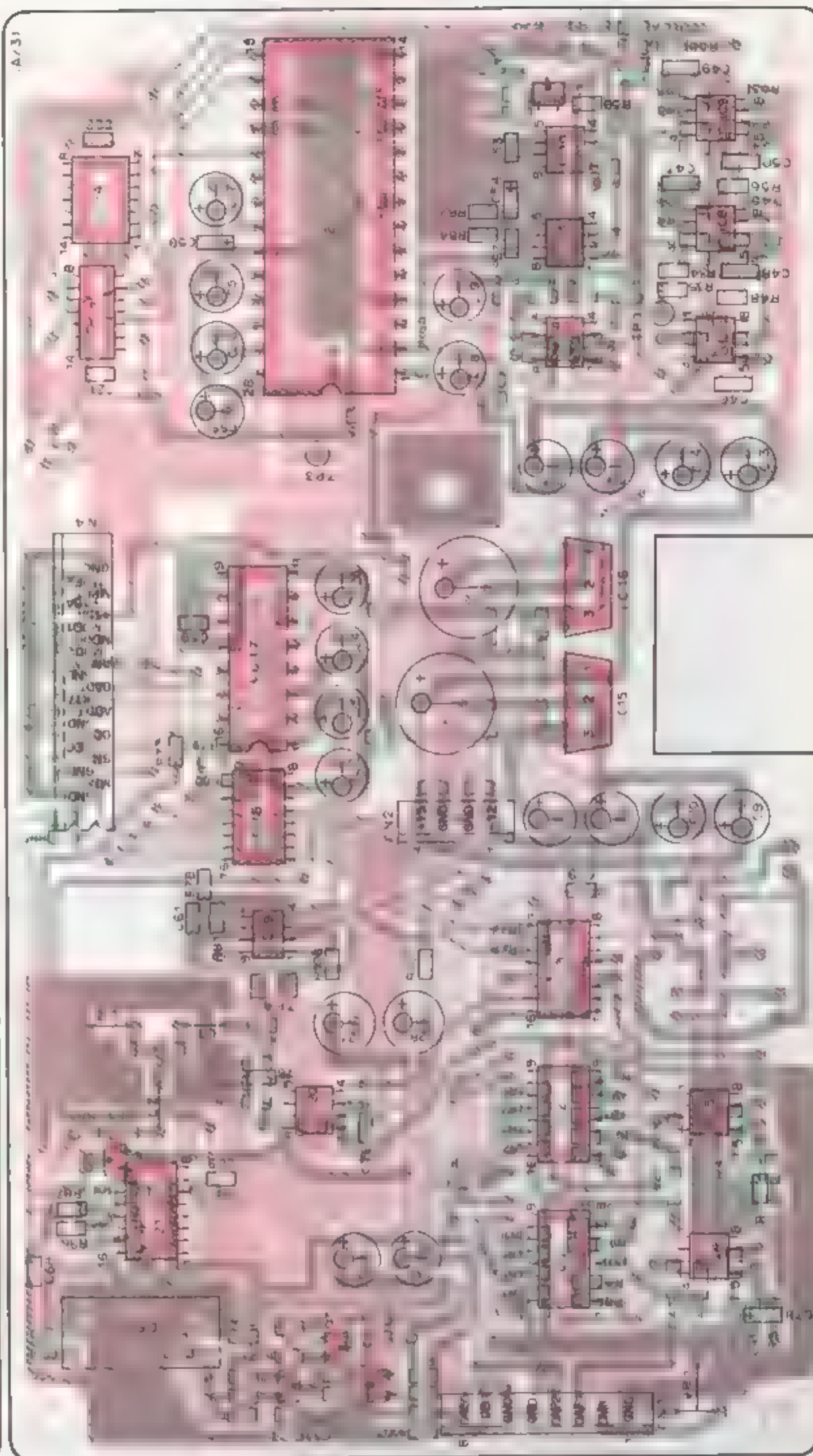
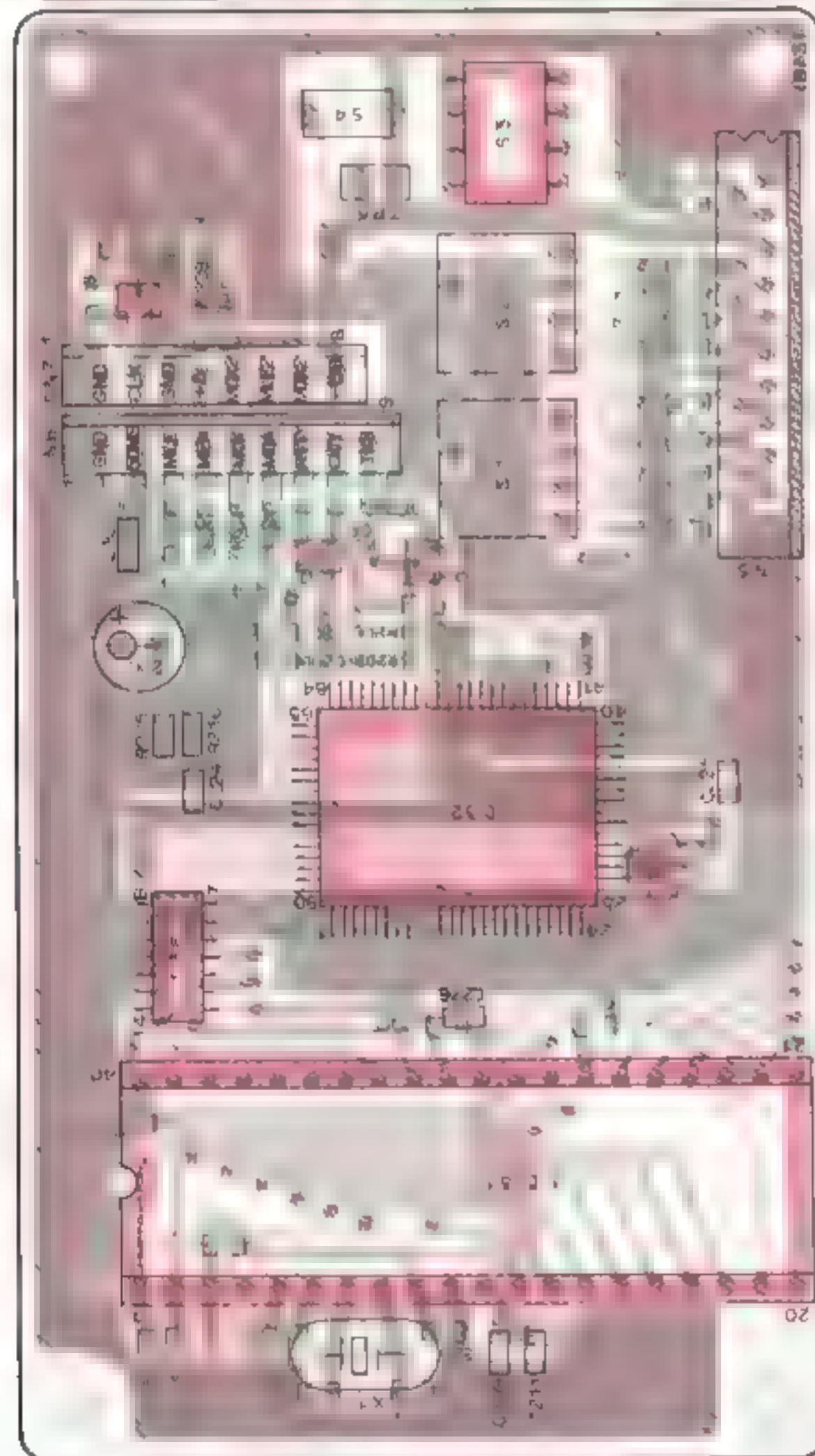
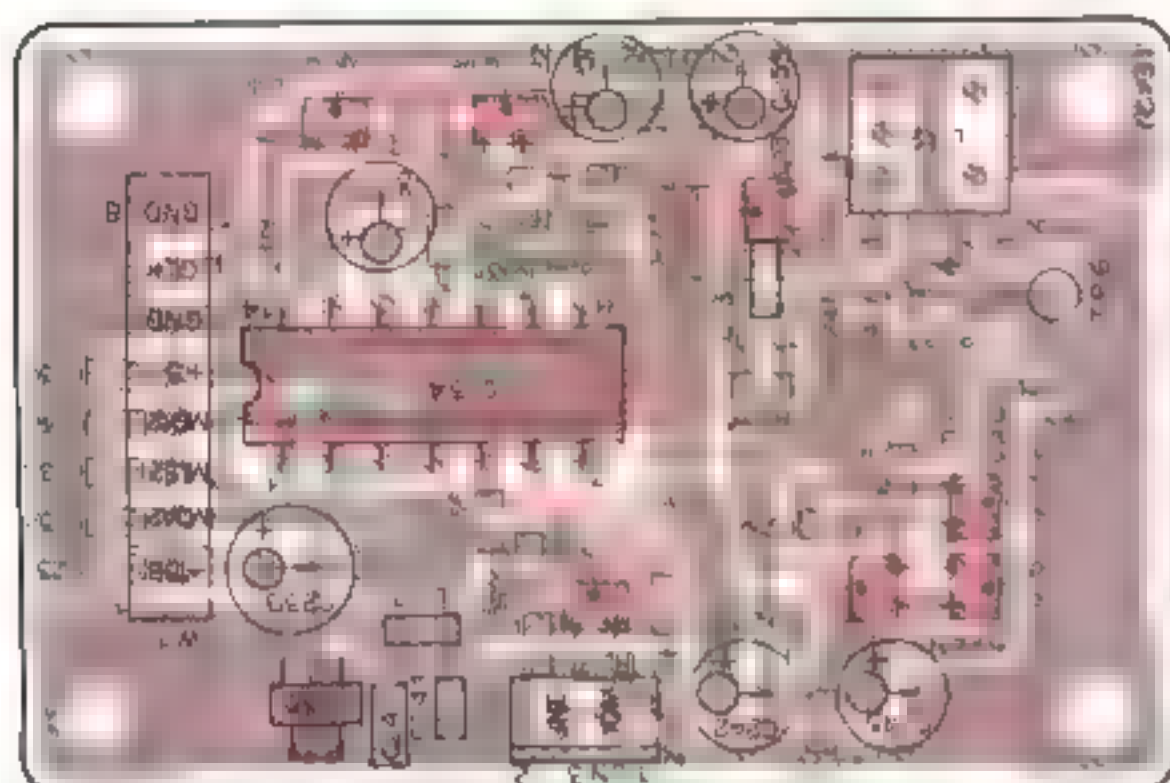


IC1, 2
IC3, 5, 6, 9, 10
IC4, 7
IC5, 8
IC6, 11
IC7, 12
IC8, 13
IC9, 14
IC10, 15
IC11, 16
IC12, 17
IC13, 18
IC14, 19
IC15, 20

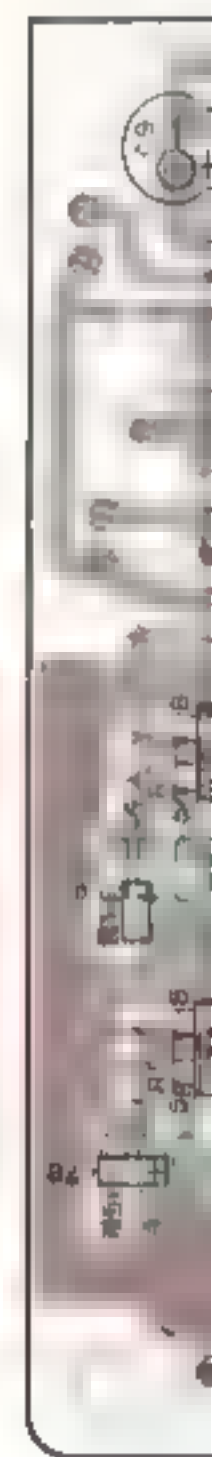
SN74S74N IC1
TC4066BP IC2, 3
BA6109U2 IC4, 5
NJM2093S IC6, 9, 10
NJM2045 IC7
NE555C IC8

TS-950S/SD PC BOARD VIEWS

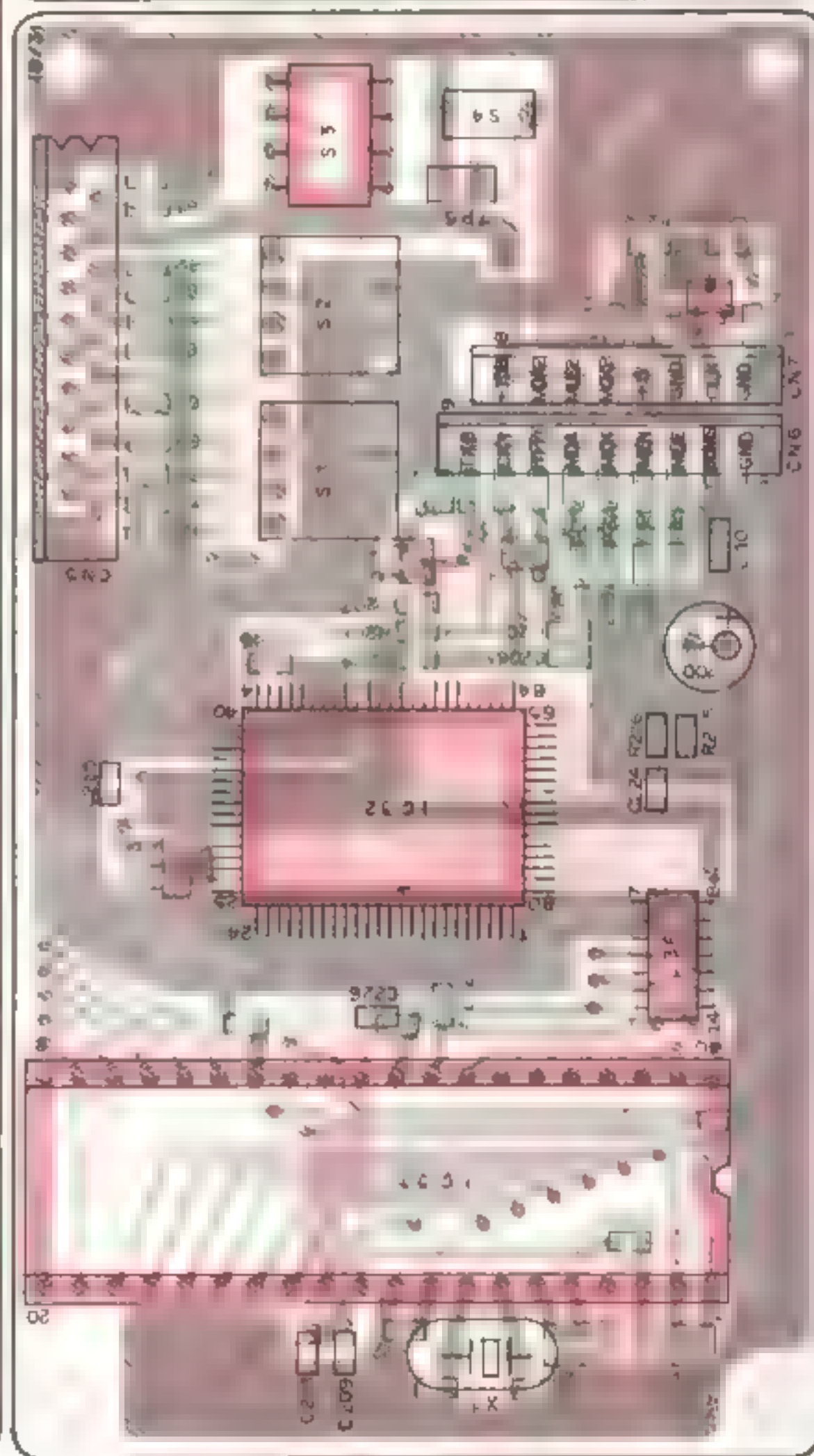
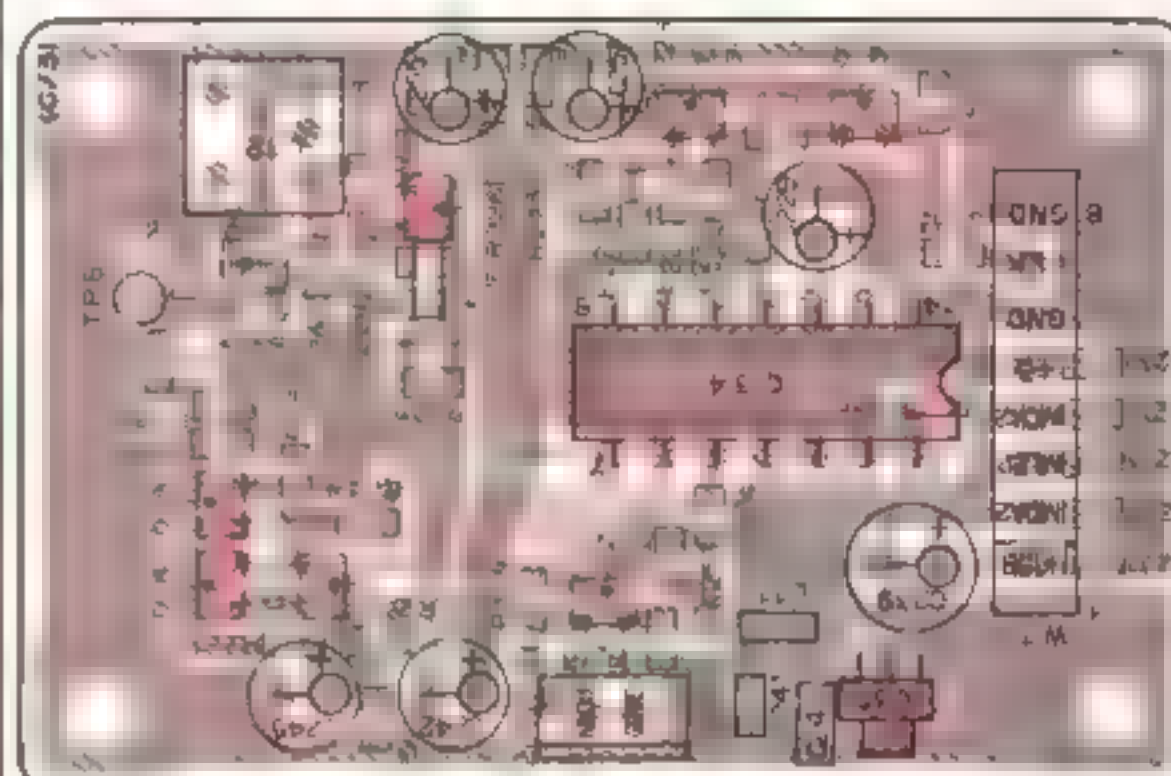
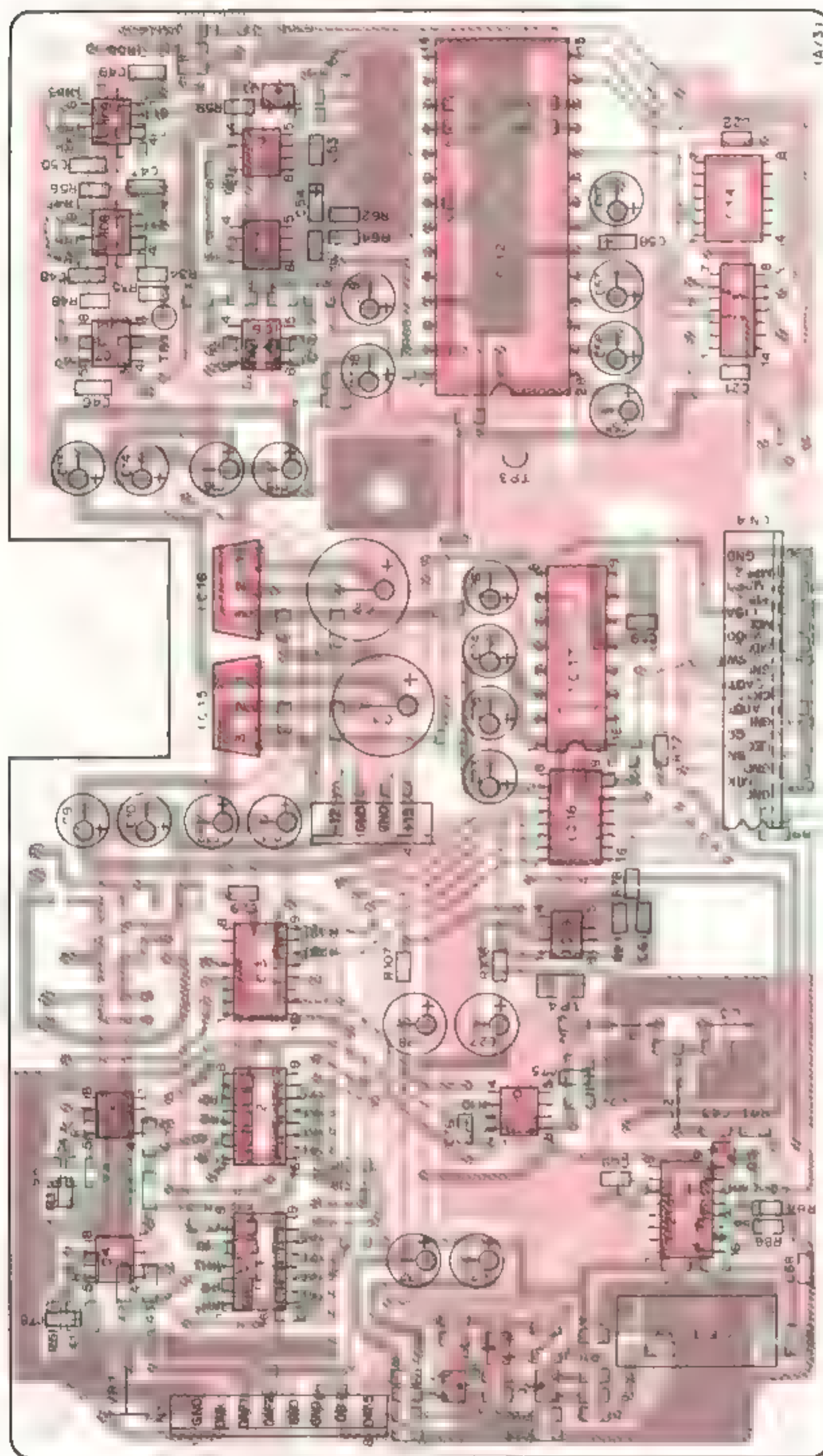
DSP UNIT (X53-3260-00) Component side view



DSP UNIT (X53-3260-00) Component side view

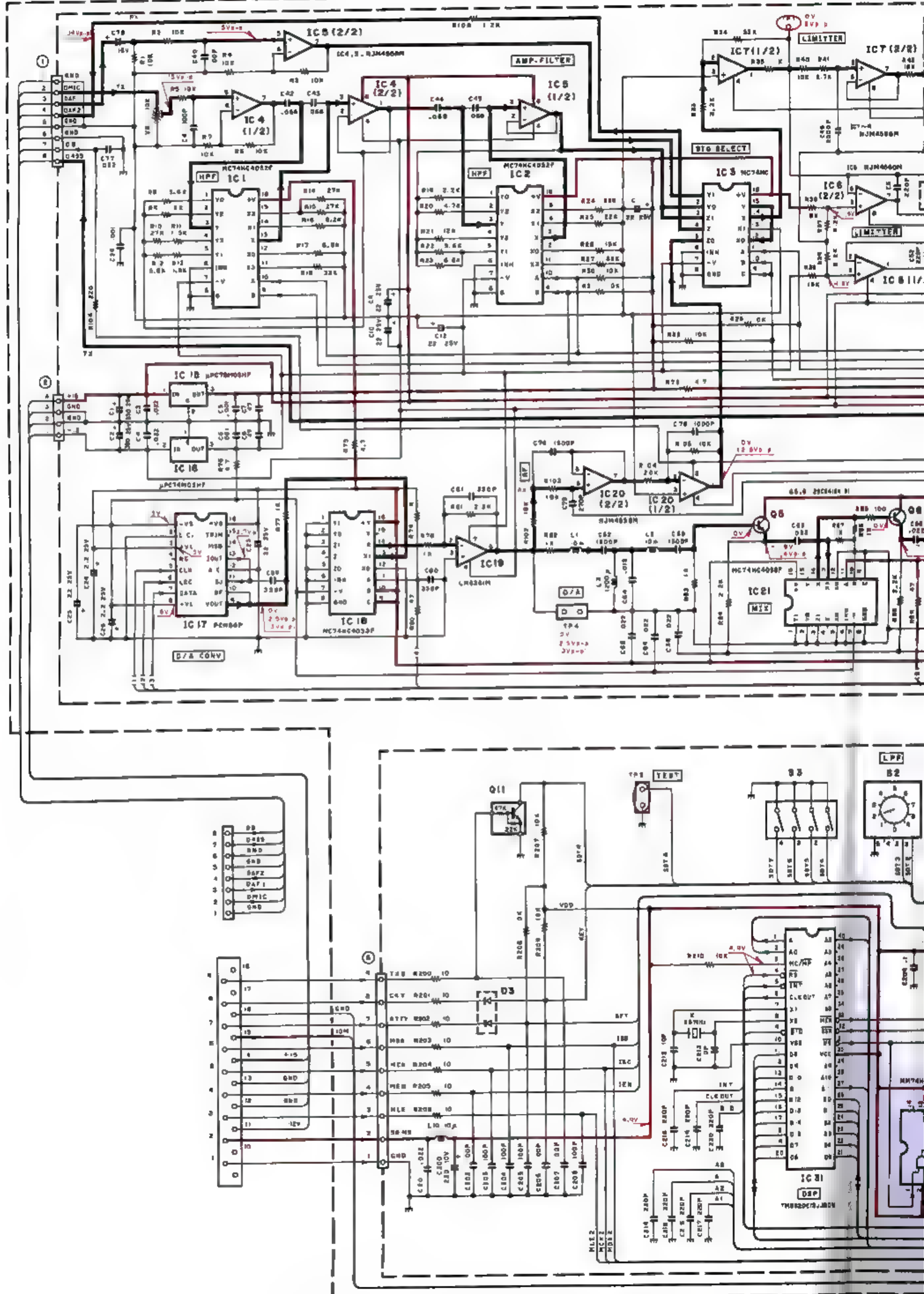


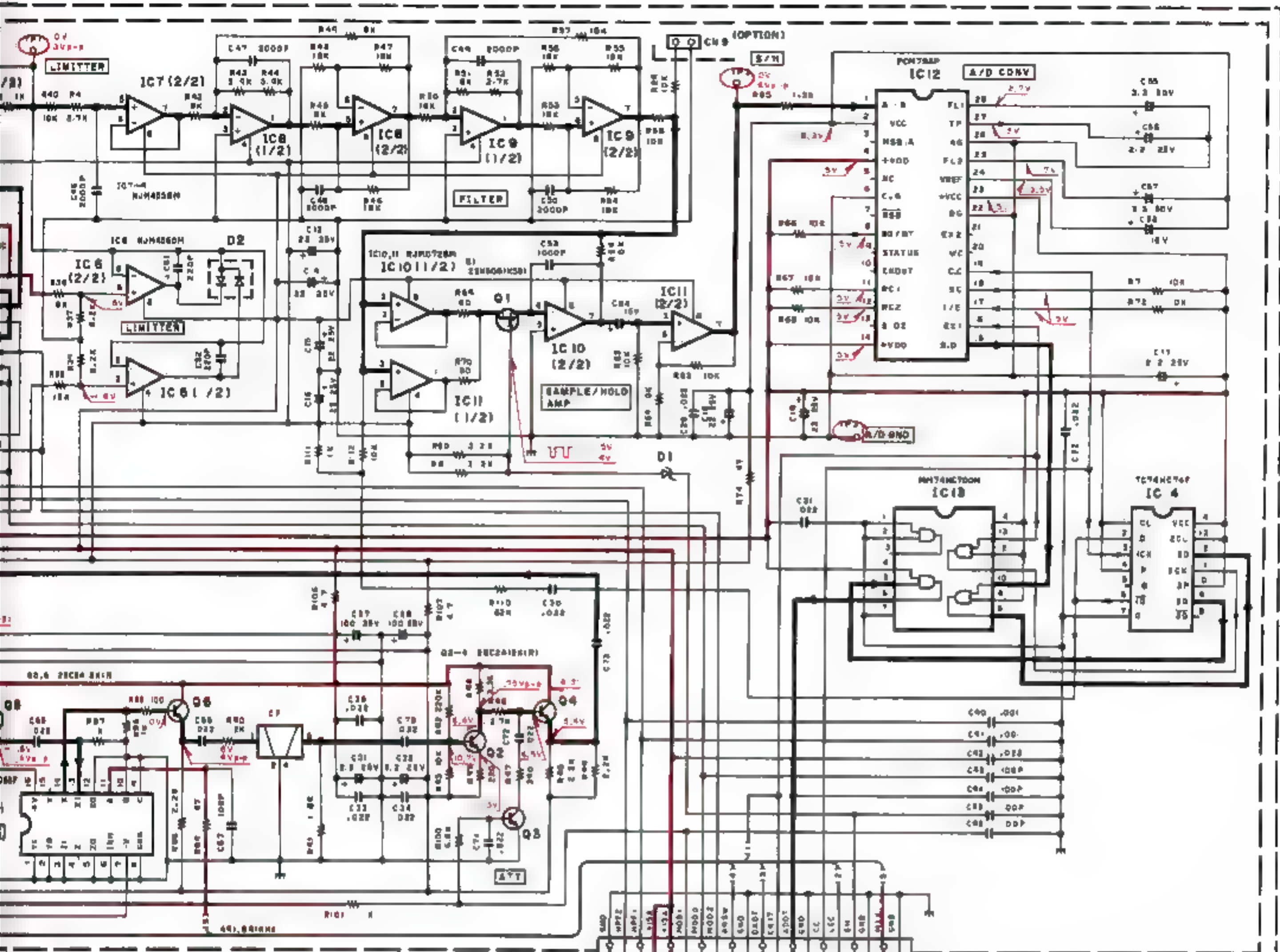
DSP UNIT (X53-3260-00) Foil side view



DSP UNIT (X53-3260-00) : TS-950SD

DSP UNIT (X53-3260-00)



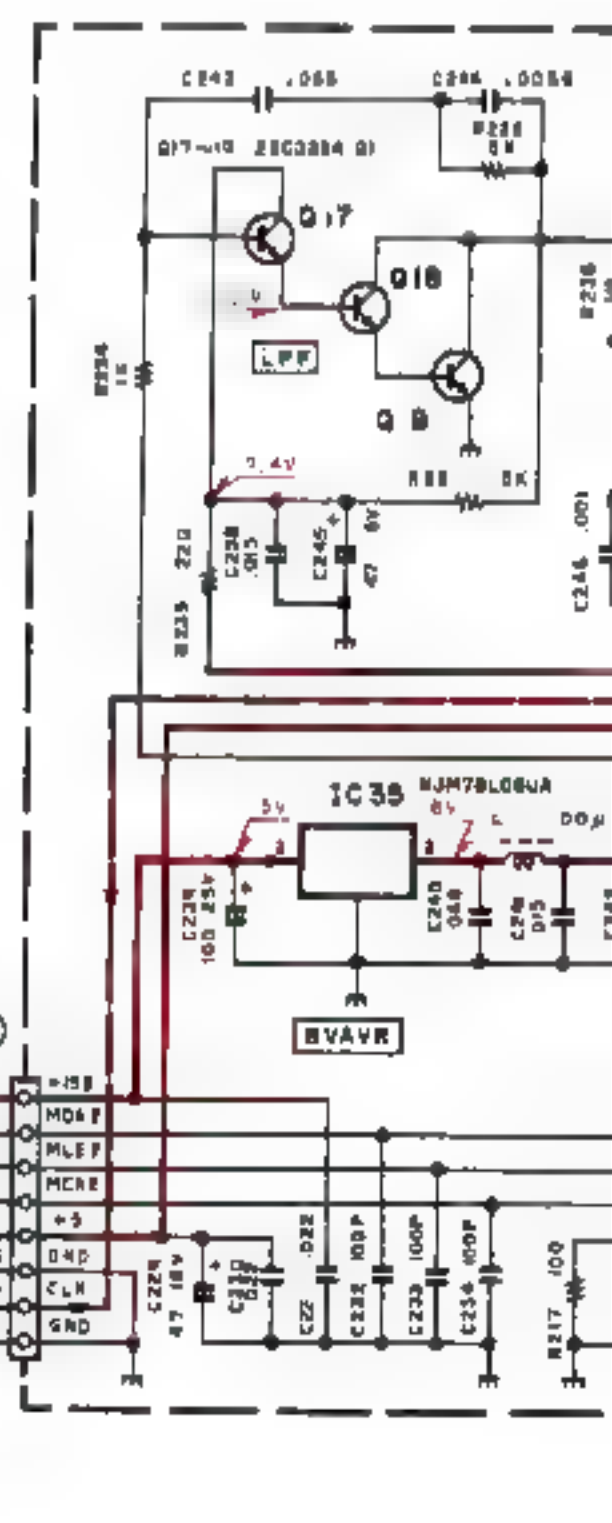
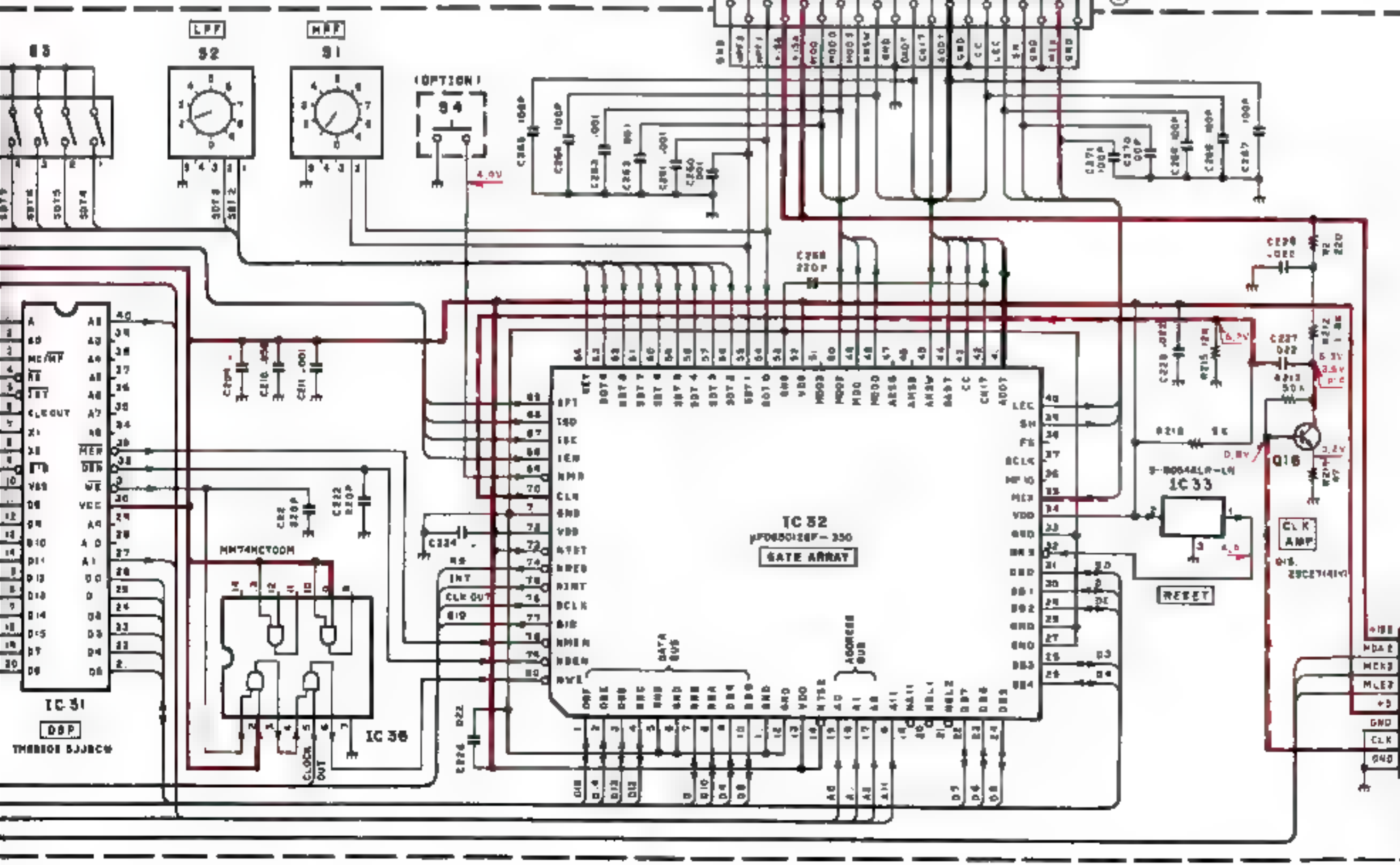


1) RX - 55B
OMIC - 15V
DAF - 15V

IC 1, 2
IC 3, 10, 21
IC 4, 5, 7-9, 20
IC 6
IC 10, 1
IC 12
IC 13, 36
IC 14
IC 15
IC 16
IC 17
IC 18
IC 19
IC 31
IC 32
IC 33
IC 34
IC 35

Q
Q2~6
Q1
Q12, 14~16
Q13
Q17~19

D
D2
D3
D4



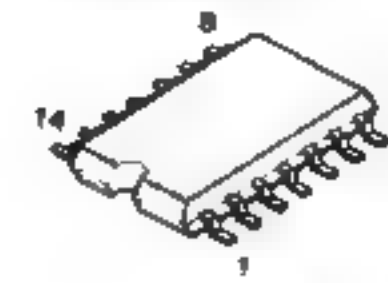
CIRCUIT DIAGRAM TS-950S/SD

RX-SSB
DMIC 15Vp-p KHz VR1 MAX
DAF1 5Vp-p KHz

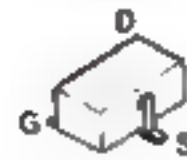
2SC2412K
2SC2714
2SC3324
DTC124WK



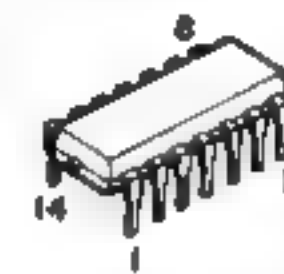
MM74HCT00M



2SK210



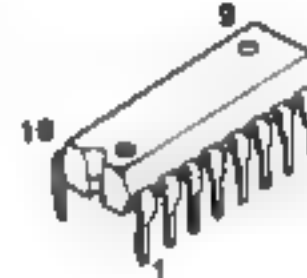
CX-7925B



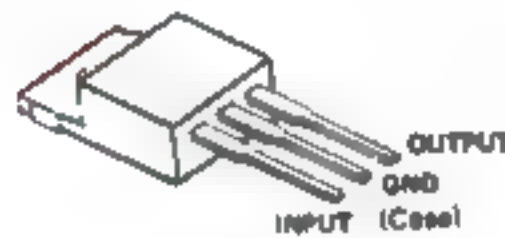
2SK508



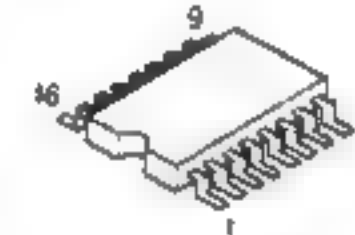
PCM56P



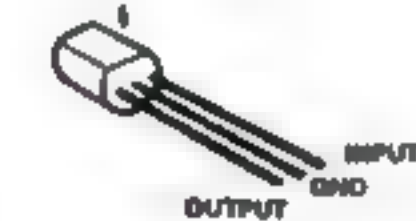
NJM78L08UA
μPC78M05HF
μPC79M05HF



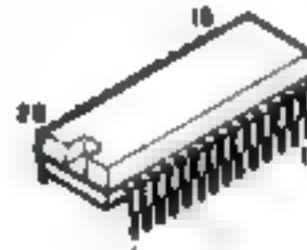
MC74HC4052F
MC74HC4053F
TC74HC74AF



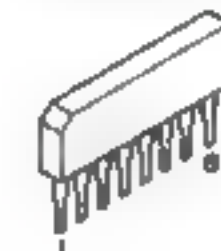
S-8054ALR-LN



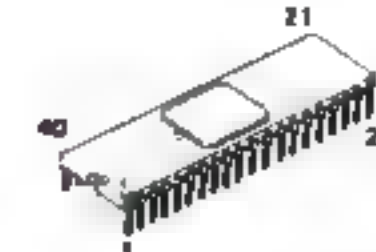
PCM78AP



NJM072BM



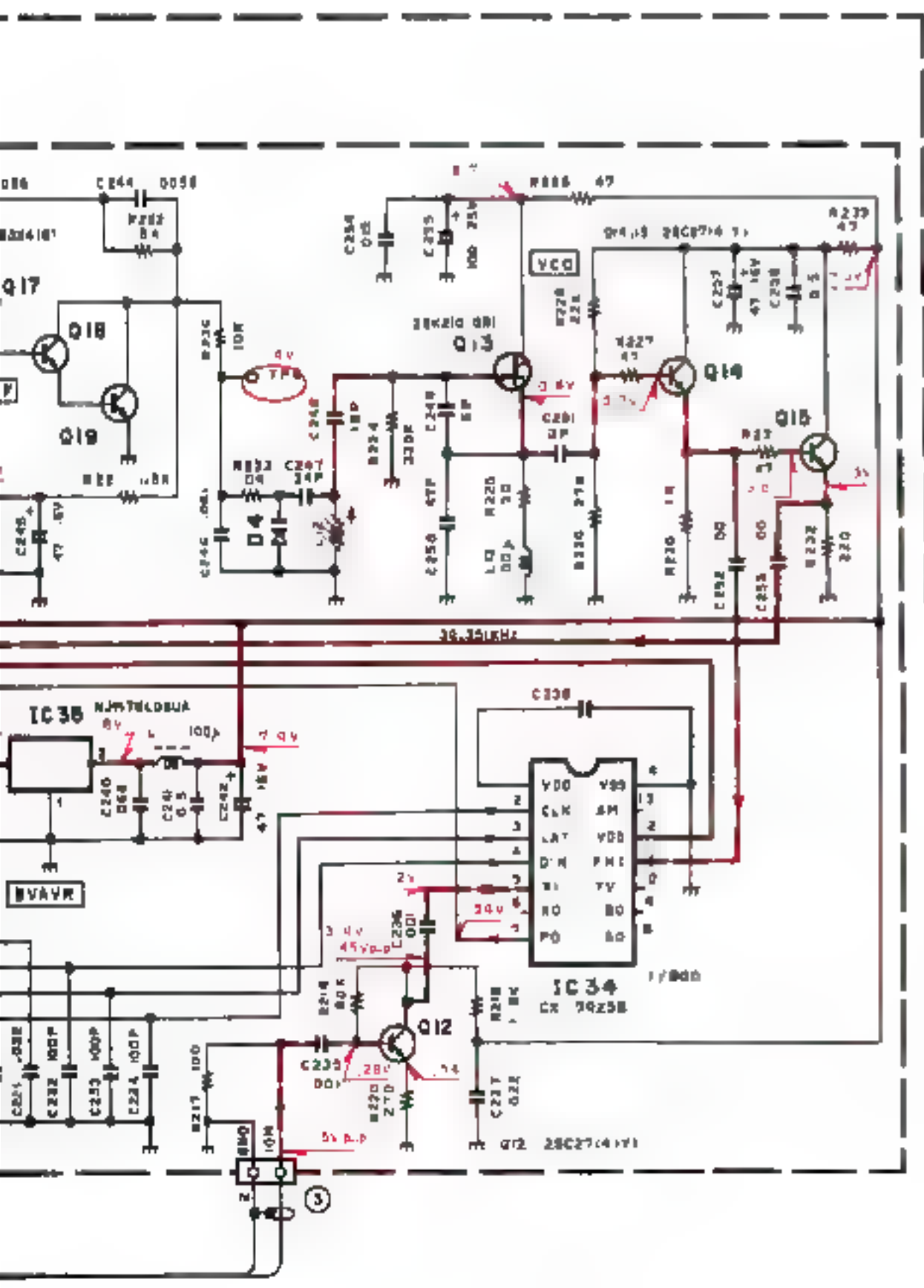
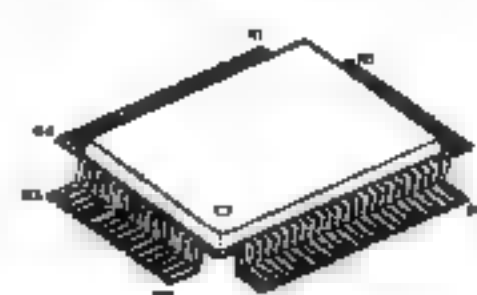
TMS320E15JJC1



LM6361M
NJM4558M
NJM4560M



μPD66012GF-350

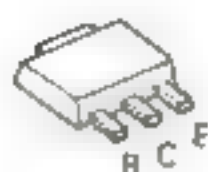


TS-950S/SD PC BOARD VIEWS

2SA1163



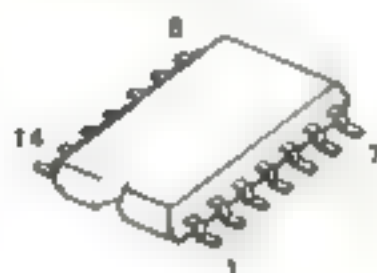
2SA1201



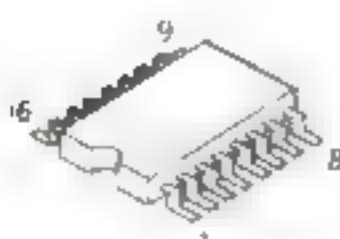
FMG1



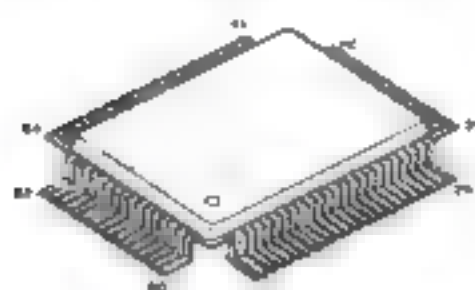
TC74HC00AF
TC74HC04AF
TC4011BF



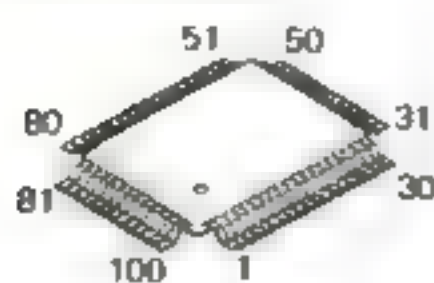
TC74HC138AF
TC74HC175AF
TC74HC574AF

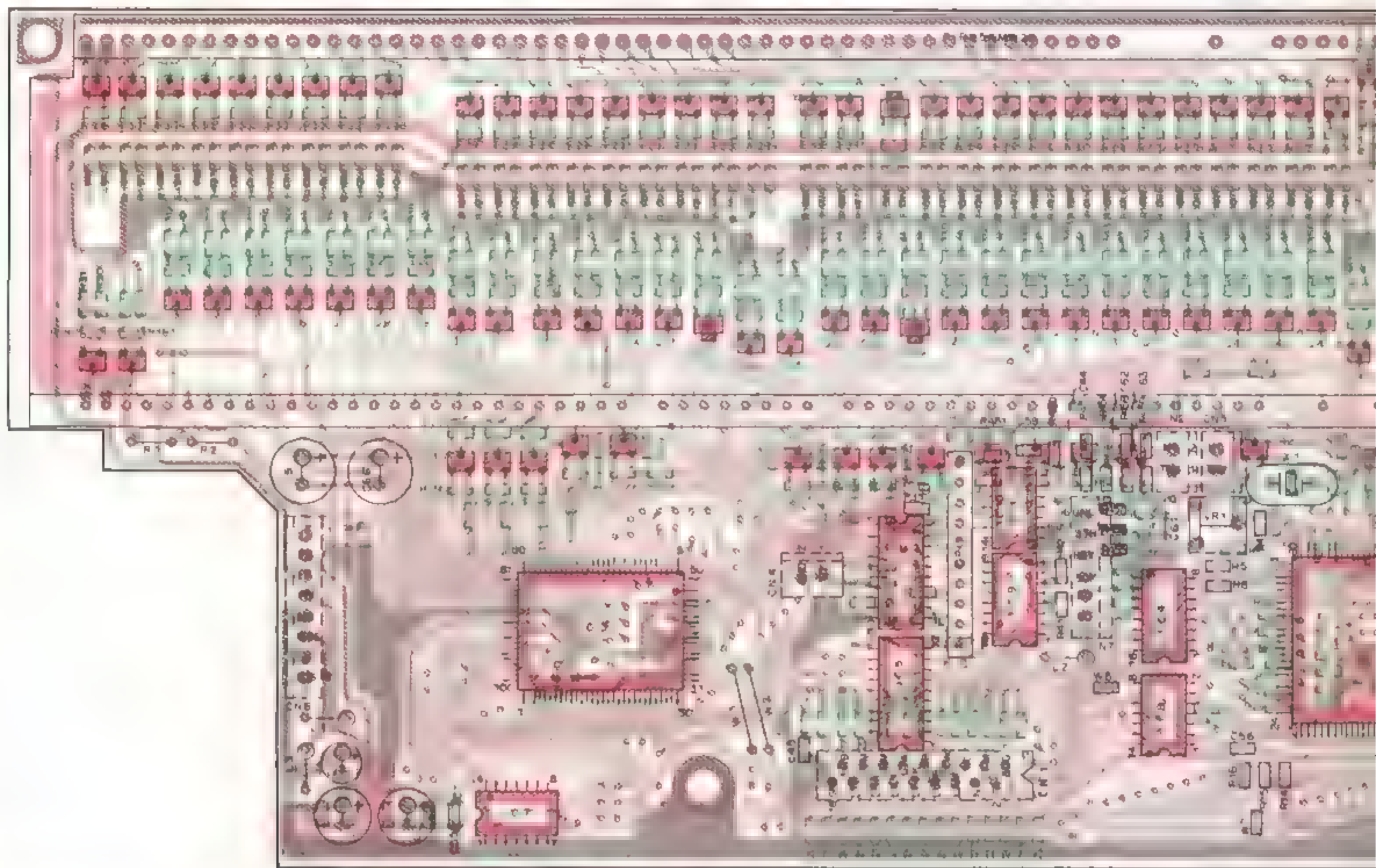
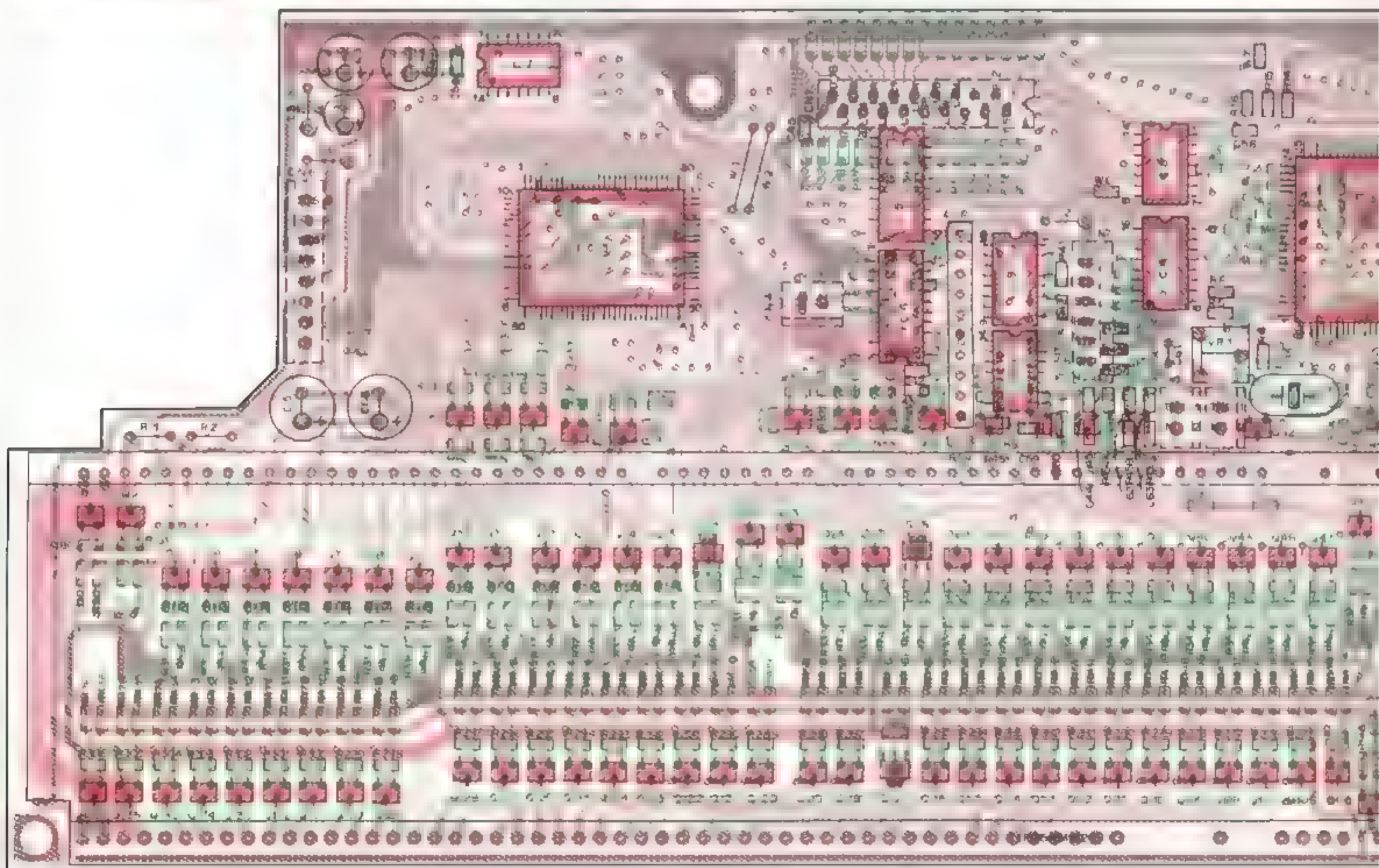


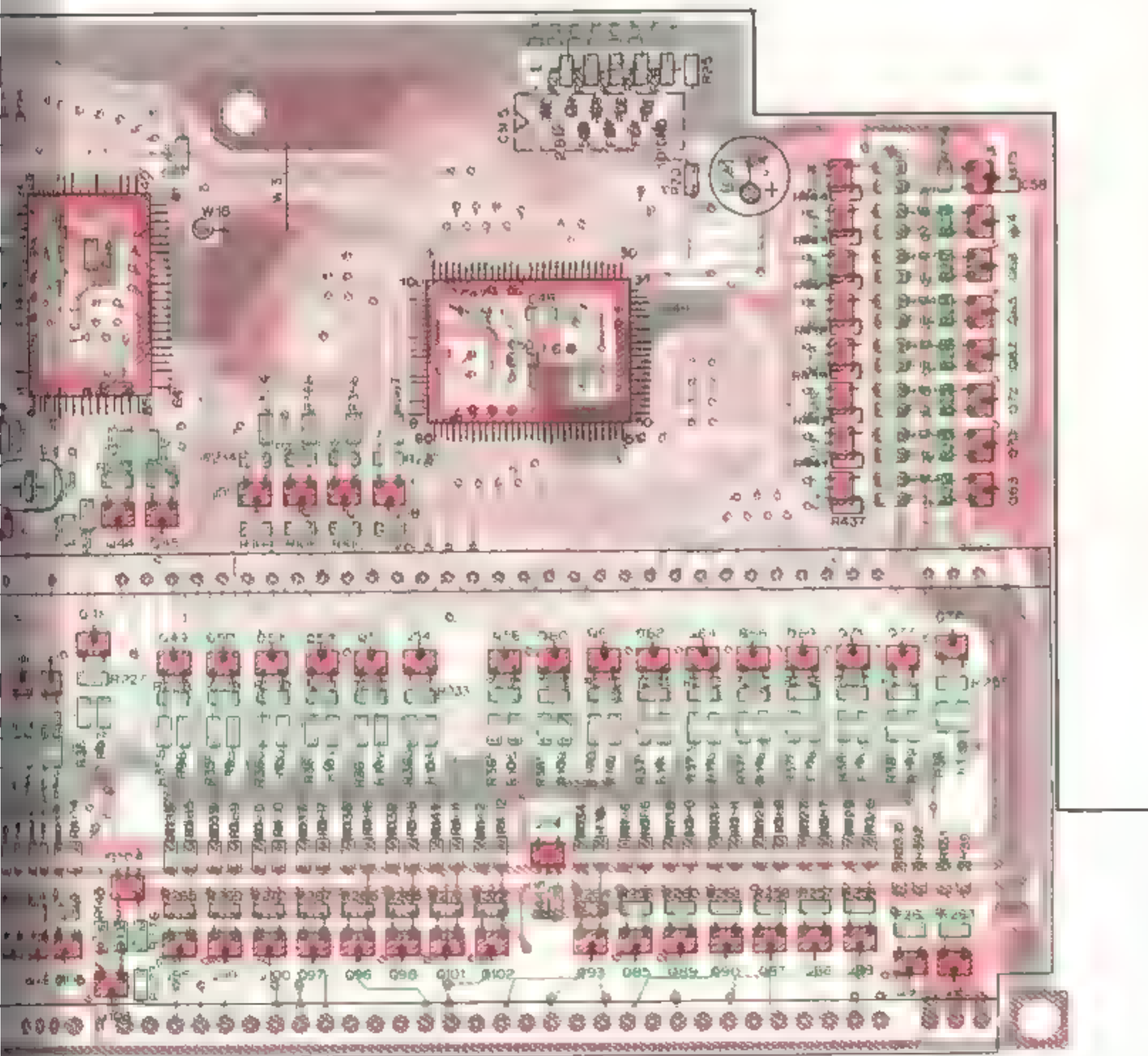
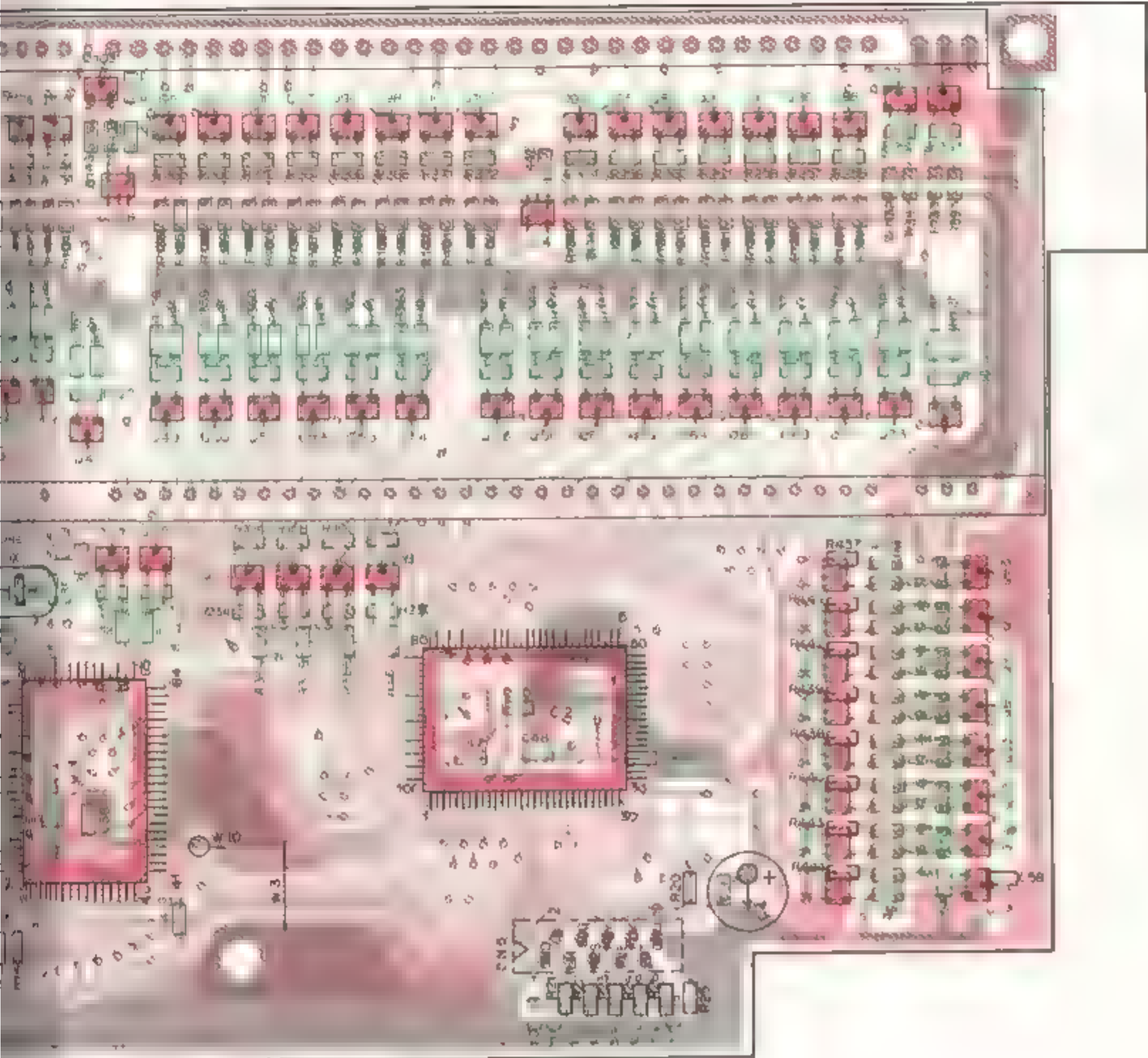
647180X0FS6JBE1

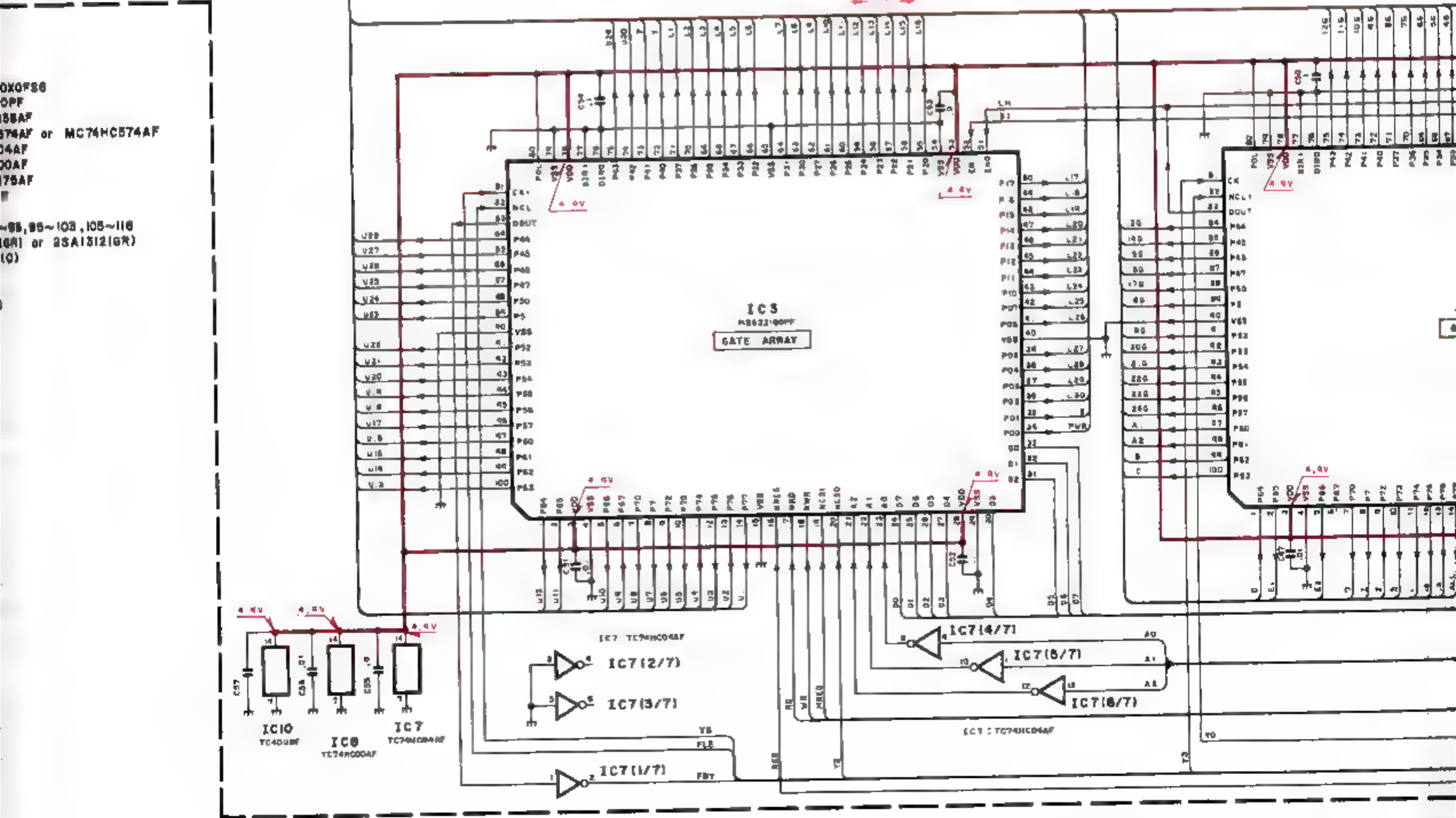


MB622180PF

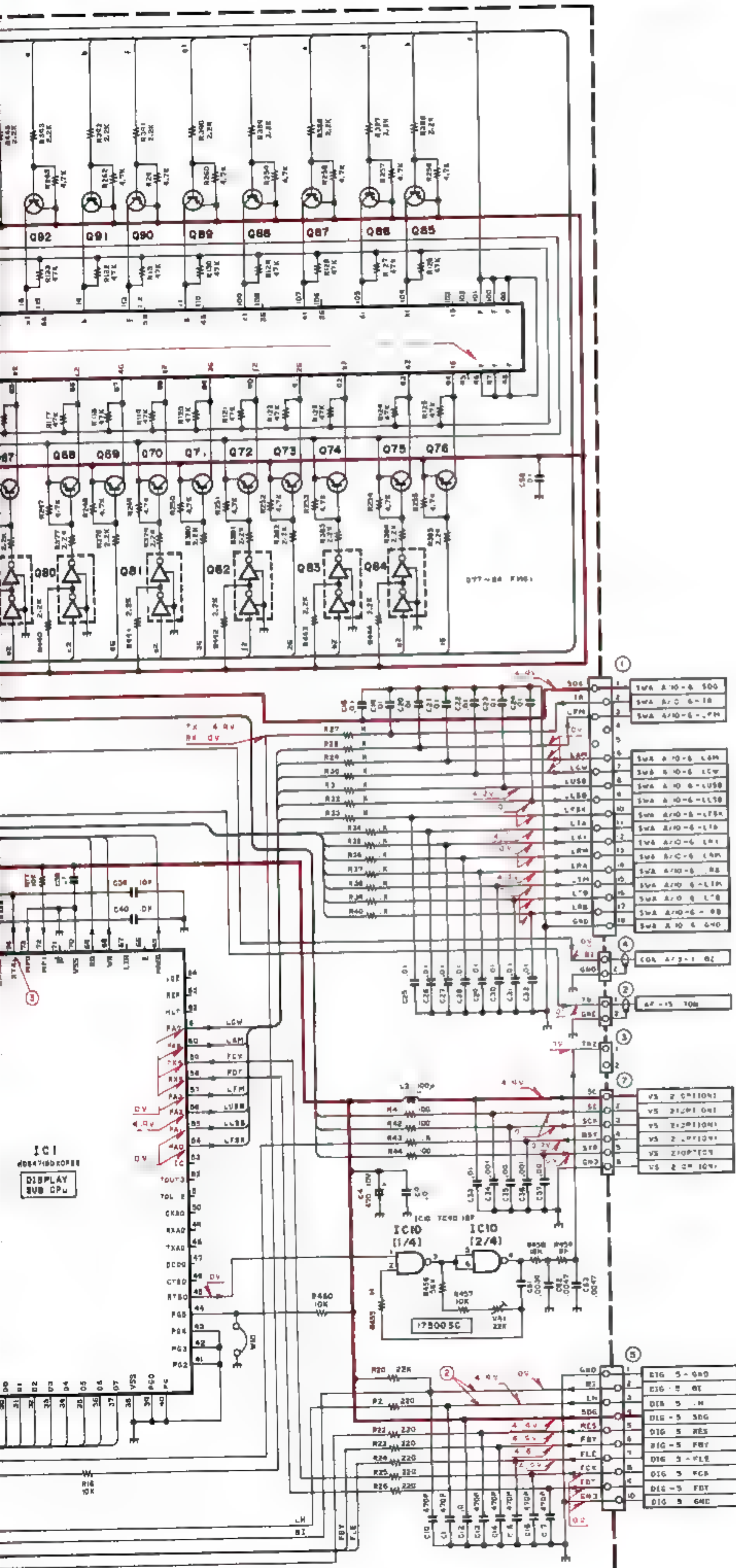


DISPLAY UNIT (X54-3080-00) Component side view**DISPLAY UNIT (X54-3080-00) Foil side view**



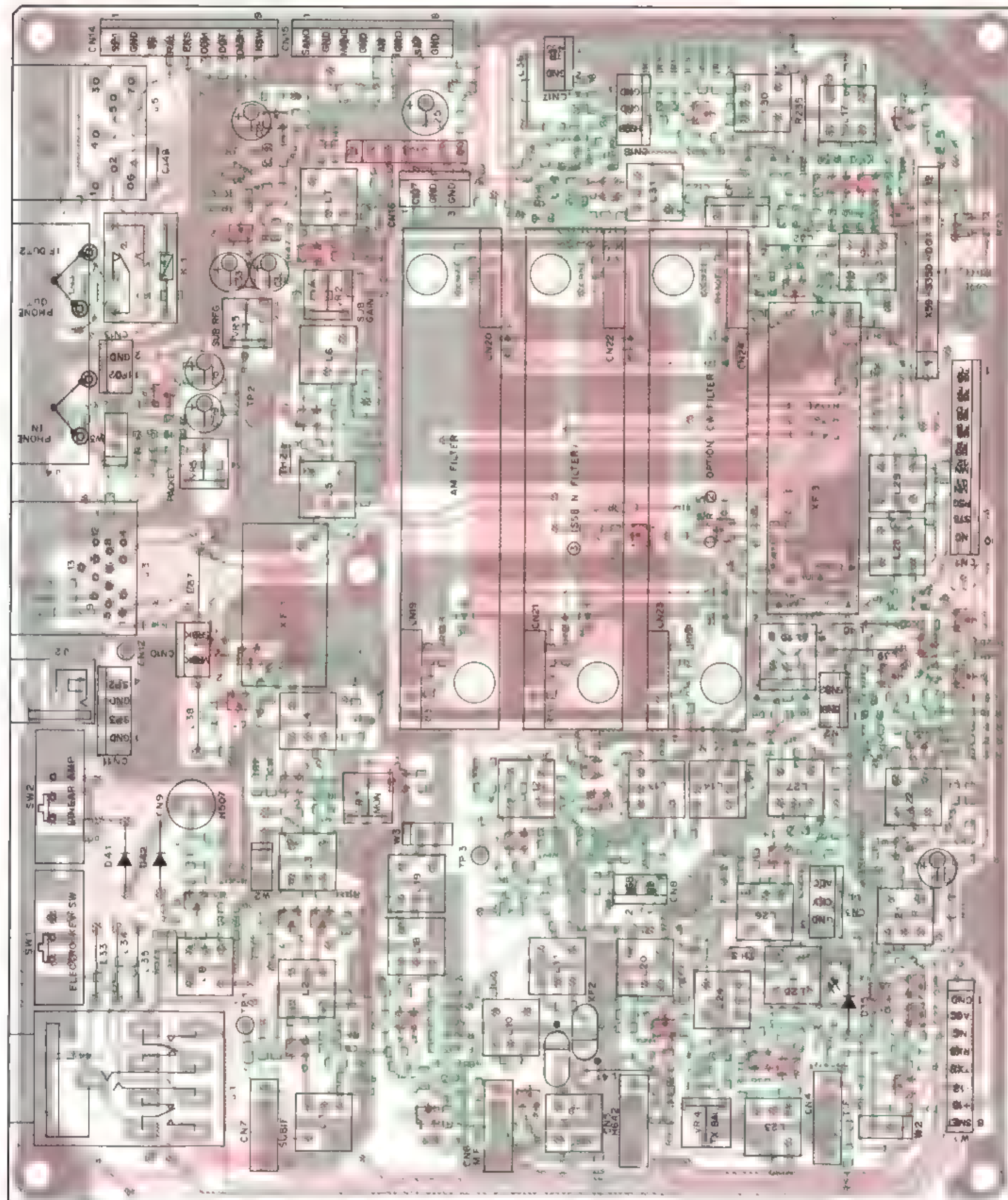


TS-950S/SD



TS-950S/SD PC BOARD VIEWS

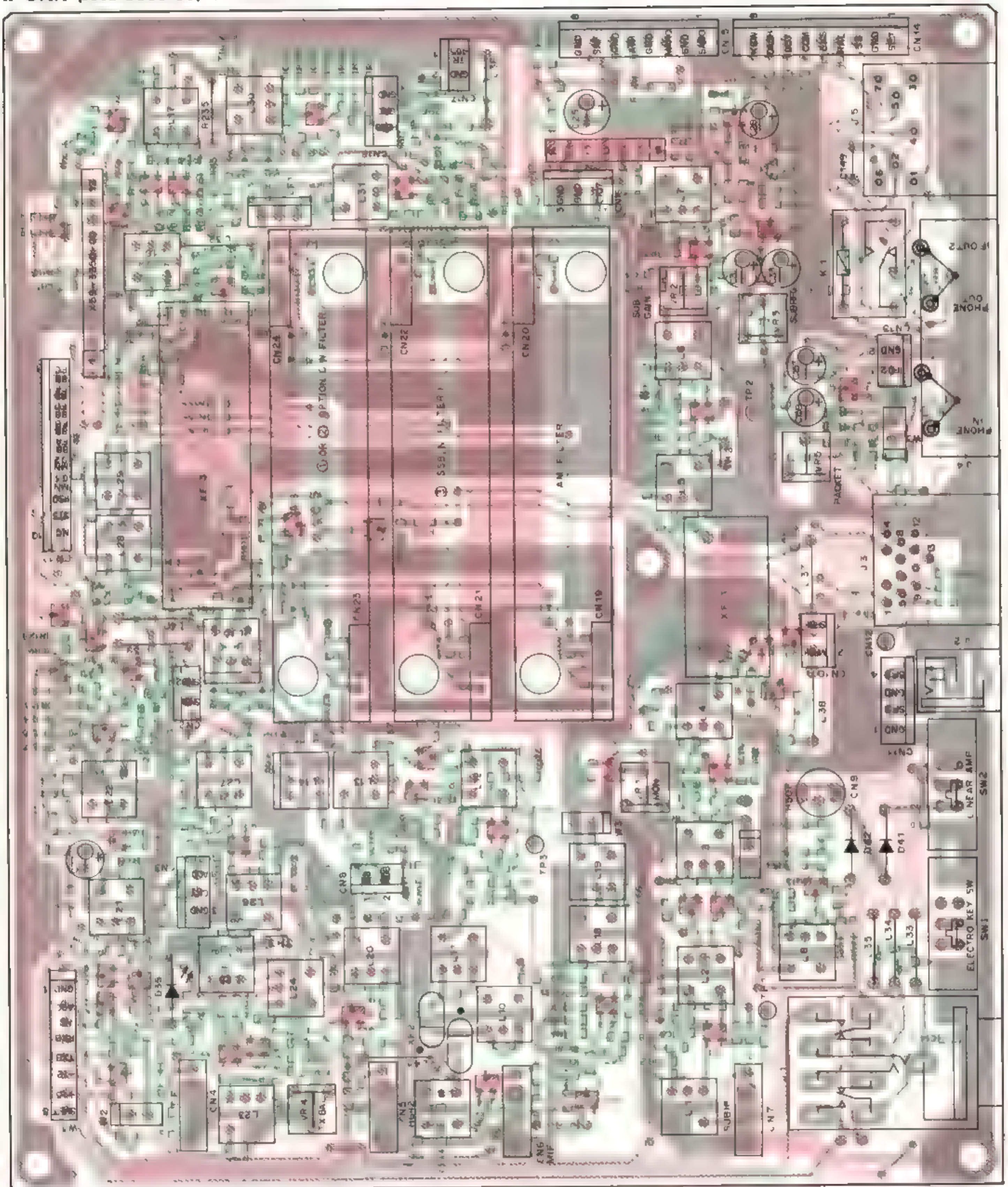
IF UNIT (X48-3060-00) Component side view



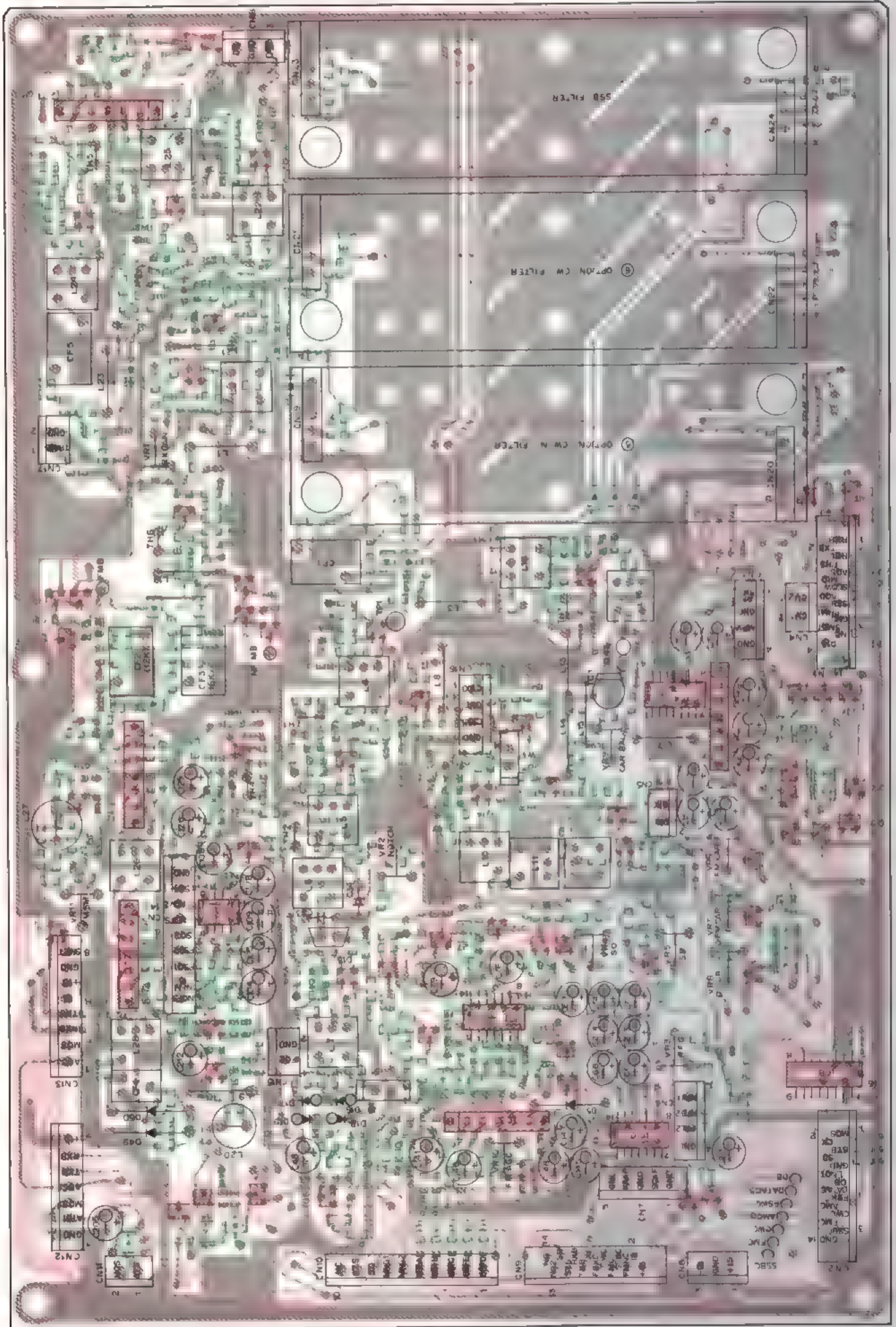
IF UNIT



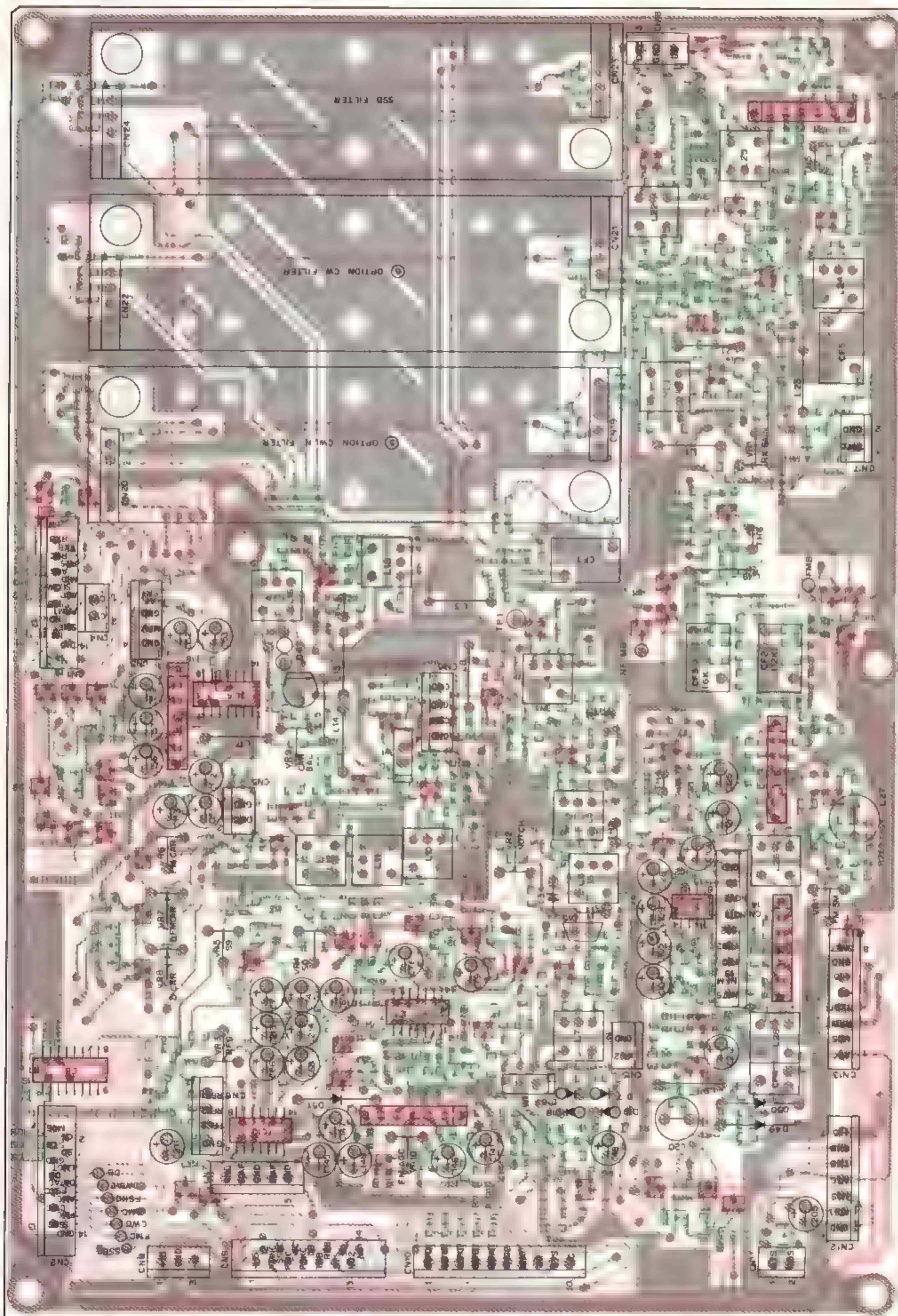
IF UNIT (X48-3060-00) Foil side view



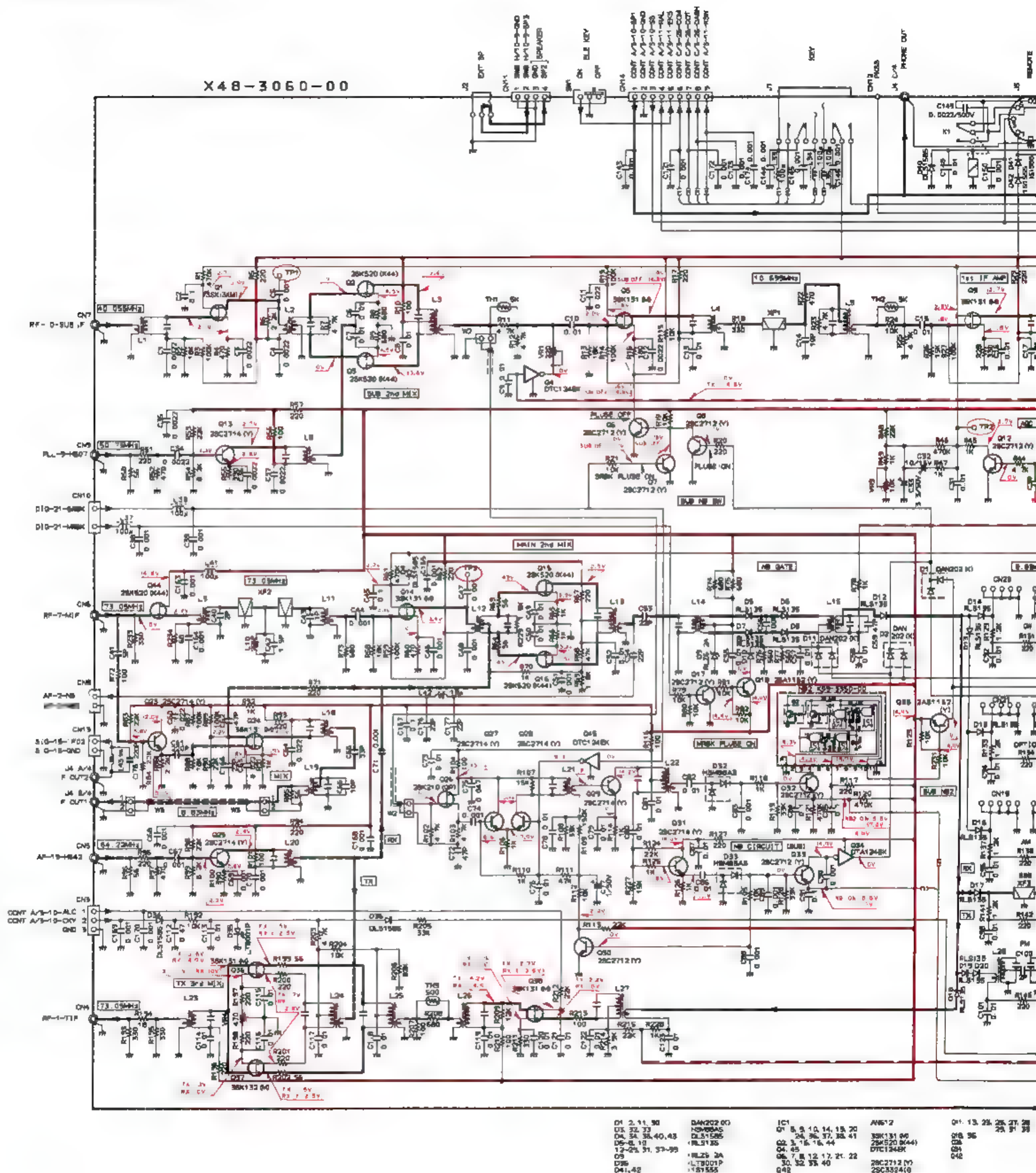
SIGNAL UNIT (X57-3380-00) Component side view



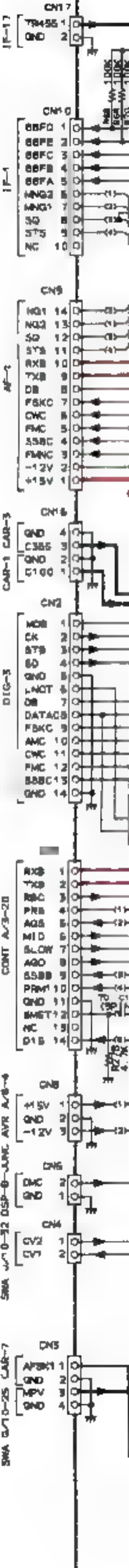
SIGNAL UNIT (X57-3380-00) Foil side view



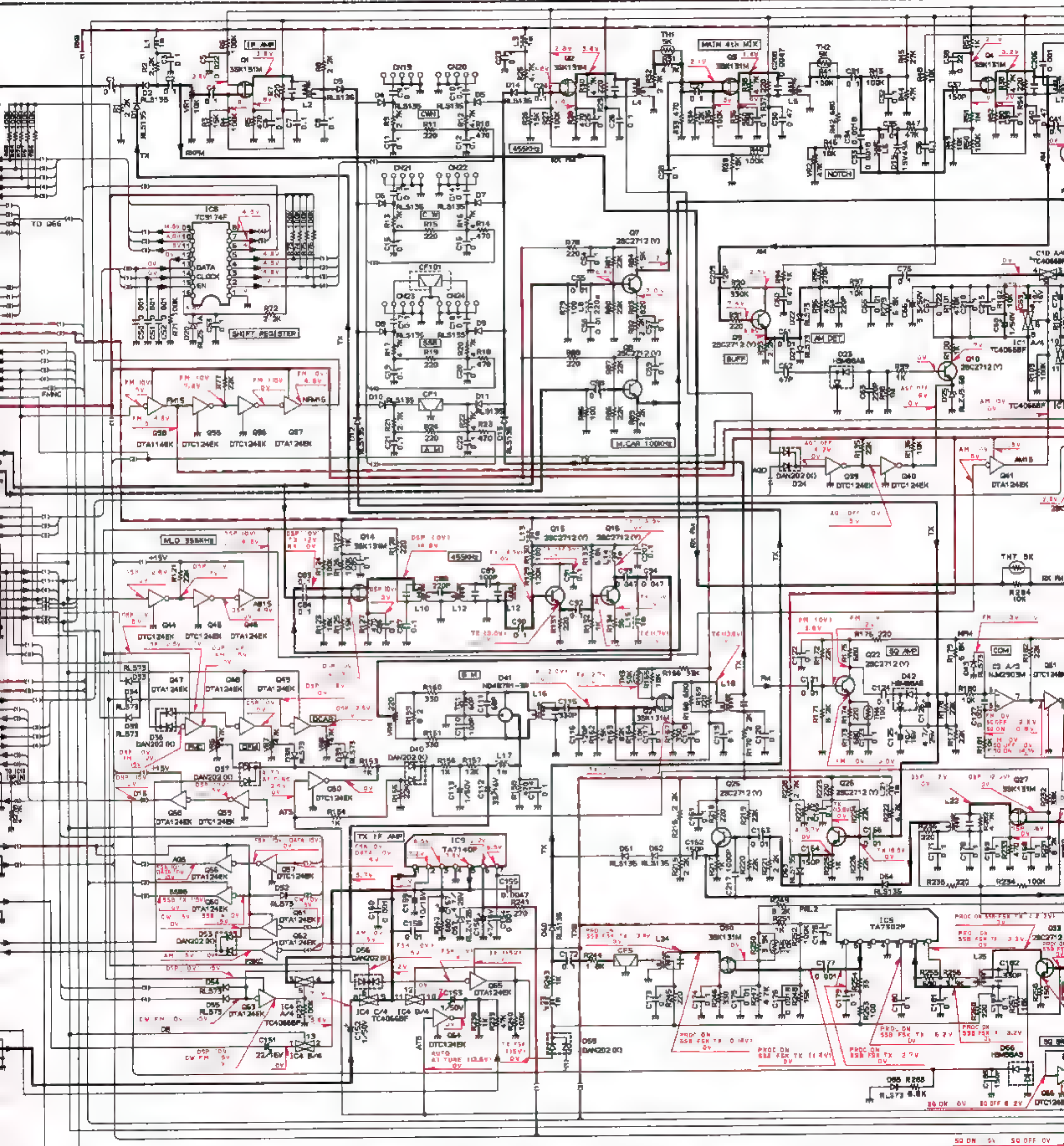
IF UNIT (X48-3060-00)



| | | | | | |
|-------------------|-----------|-------------------------|--------------|------------|------------|
| DN 2. 11. 90 | D4N202 00 | IC1 | A4512 | Q1: 13. 2% | 26. 27. 28 |
| US 32. 33 | NOMBAS | 05 8. 10. 14. 15. 20 | | | 29. 31 |
| DA 54. 35, 40, 43 | DL31585 | 04 24. 36. 37. 38. 41 | 33K131 00 | Q16 36 | |
| D5-41, 10 | RL3135 | 02 3. 15. 16. 44 | 26C520 0K44) | Q17 36 | |
| 13-26, 31, 33-39 | | 04 45 | DTIC12451 | Q18 | |
| 11-21, 31 | 11-21, 31 | 06 7. 8. 12. 17. 21. 22 | | Q19 | |
| US 35 | 4178001P | 30. 32. 33. 40 | 26C2712 (7) | Q20 | |
| D41, 42 | 417555 | Q48 | 26C3324(8) | | |

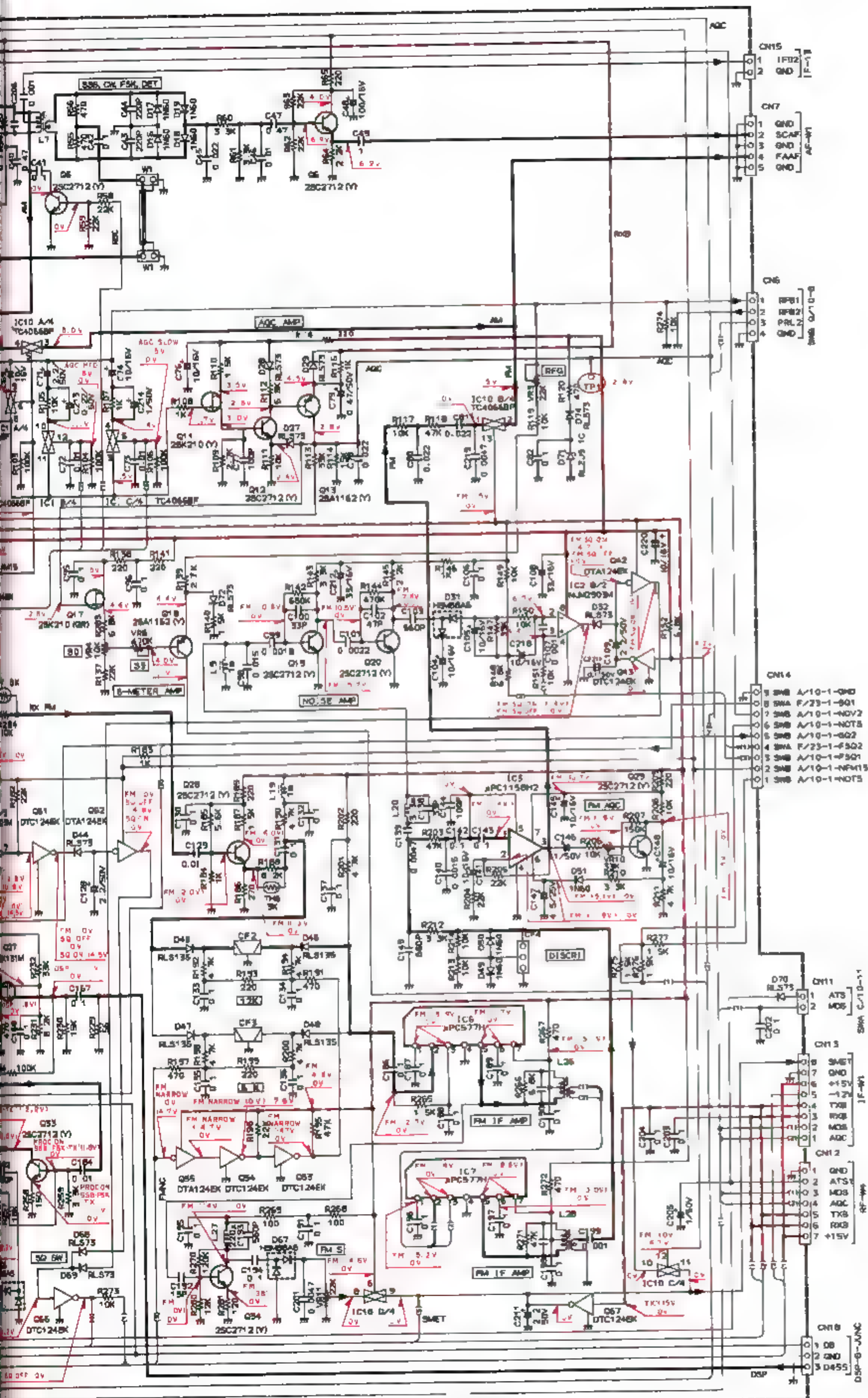


X57-3380-00



| | | | | | | | | | |
|------------|-----------------------------------|----------|--------|-----------|----------|--------------|----------------------------|-----------|-------------------------------|
| RL5195 | D1-14, 45-48, 60-64 | RLZ5 1A | 020 | TC4066BF | IC1 4.10 | 33K133M | Q5-4, 14, 21, 27, 30 | DTCA1248K | Q35, 36, 39, 40, 43-45, 50 |
| RL578 | D21 22, 27-30, 32-36, 38, 39, 43 | RLZJ5 6C | 025 | APC1158HZ | IC3 | 25K200 (Y) | Q41 | DTA1148K | Q51 53, 54, 57, 58, 54-66, 87 |
| | D44 52, 54, 58, 60, 66-70, 72, 74 | RLZJ5 6C | 077 | TA7302P | IC5 | 25K200 (BRO) | Q47 | DTA1248K | Q38 |
| MEMBER | D23 42, 66, 67, 81 | RLZJ5 2B | 057 | APC577H | IC6, 7 | 25C2712 (Y) | Q5-10, 12, 15, 16, 19, 20 | | Q37 41, 42, 46-49, 52, 56 |
| PAN202 (O) | D24 36, 37, 40, 53, 56, 59 | ND487R | 3R 041 | TC9174F | IC8 | | Q22, 25, 26, 28, 29, 32-34 | | Q56 58, 60-63, 55 |
| 1N60 | D15-19, 49-51 | | | TA7140P | IC9 | 25A1162 (Y) | Q43, 18 | | |
| 18V484 | D15 | | | NA4293M | IC12 | | | | |

CIRCUIT DIAGRAMS TS-95



2SA1162
2SC2712
2SC2714
2SC3324
DTA114EK
DTA124EK
DTA124EK
DTC124EK



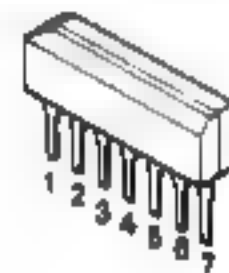
2SK210



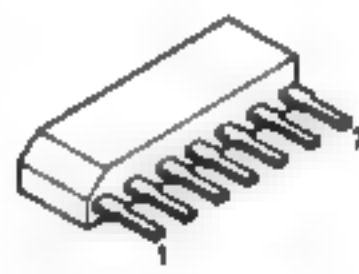
3SK131



TA7140P
TA7302P
μPC1158H2



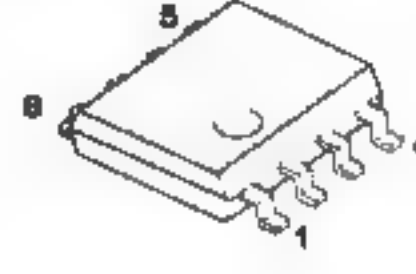
AN612



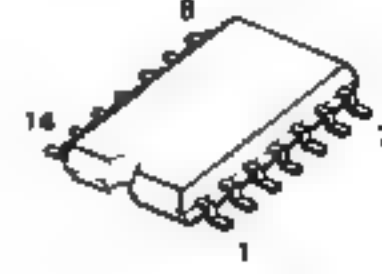
μPC577H



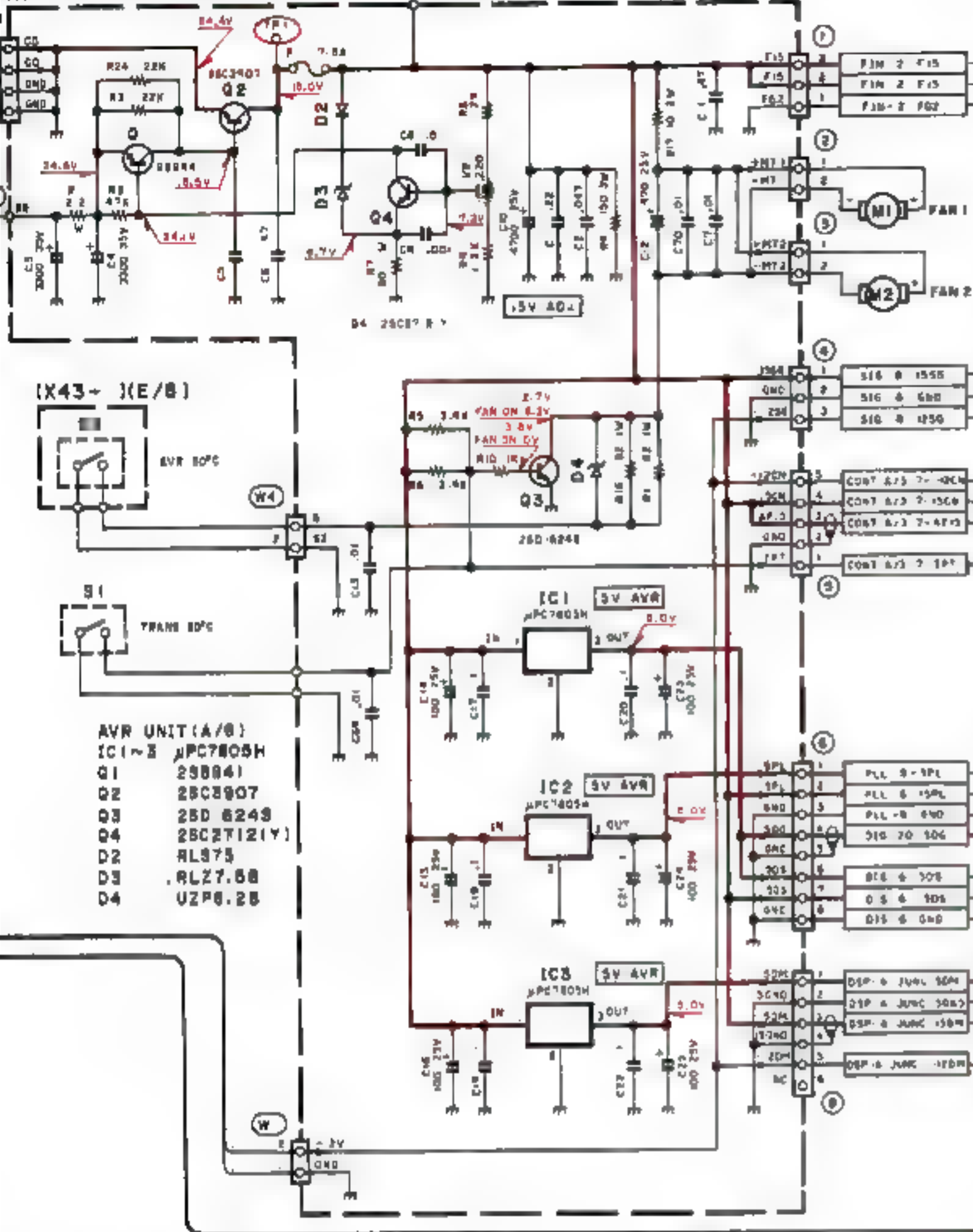
NJM2903M



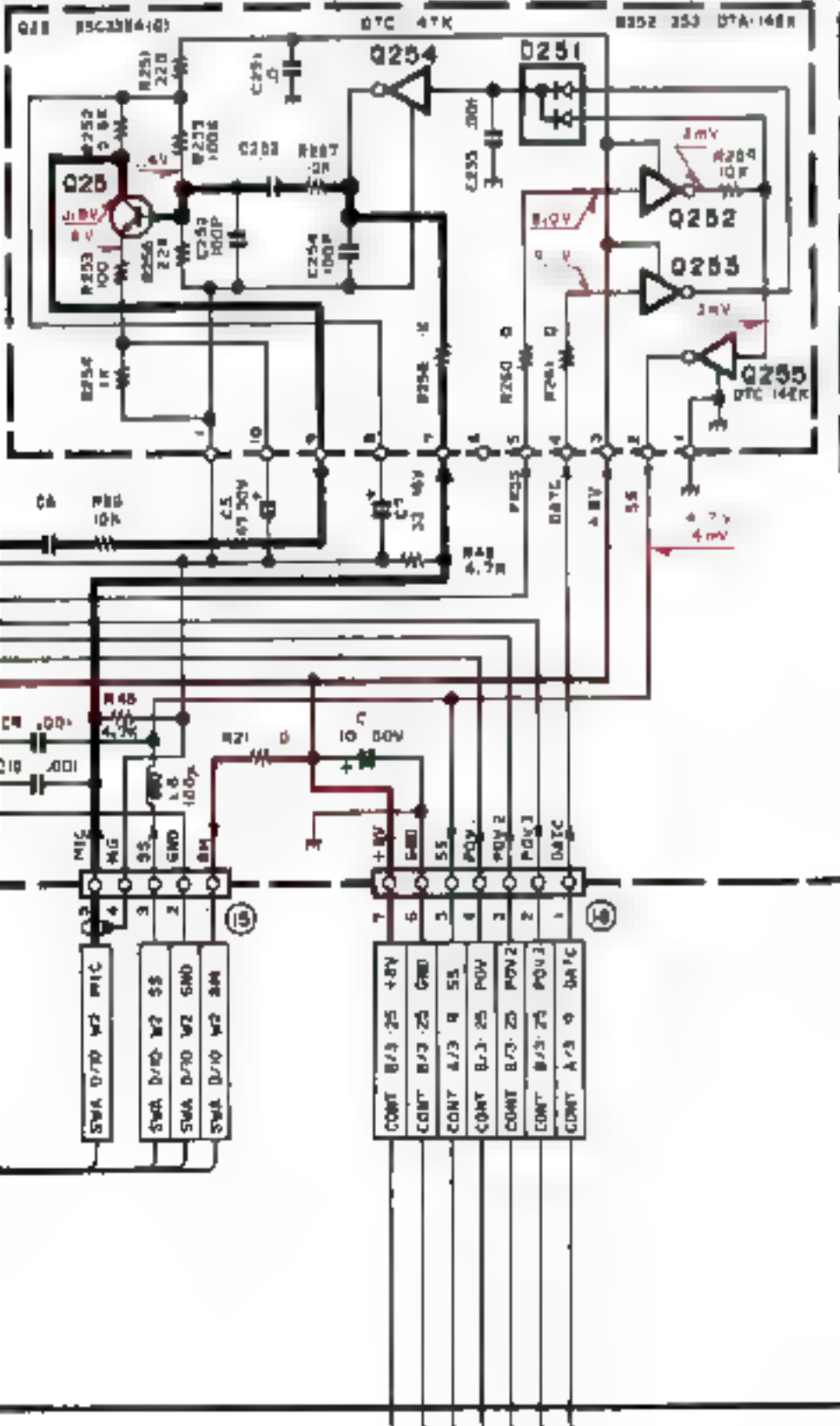
TC4066BF



AVR UNIT (X43-3070-01) (A/6)



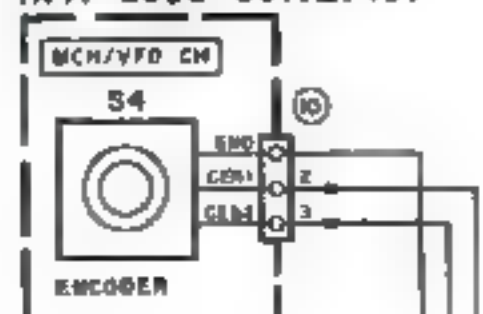
MIC AMP (X58-3710-00)



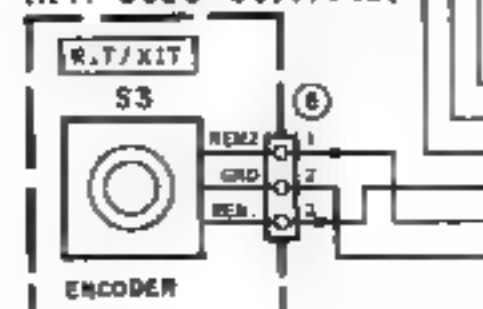
SW UNIT (A) (H/10)

Q17: 2SC3341
Q18: 2SC3341
Q19: 2SC3341
Q20: 2SC3341
Q21: 2SC3341
Q22: 2SC3341
Q23: 2SC3341
Q24: 2SC3341
Q25: 2SC3341
Q26: 2SC3341

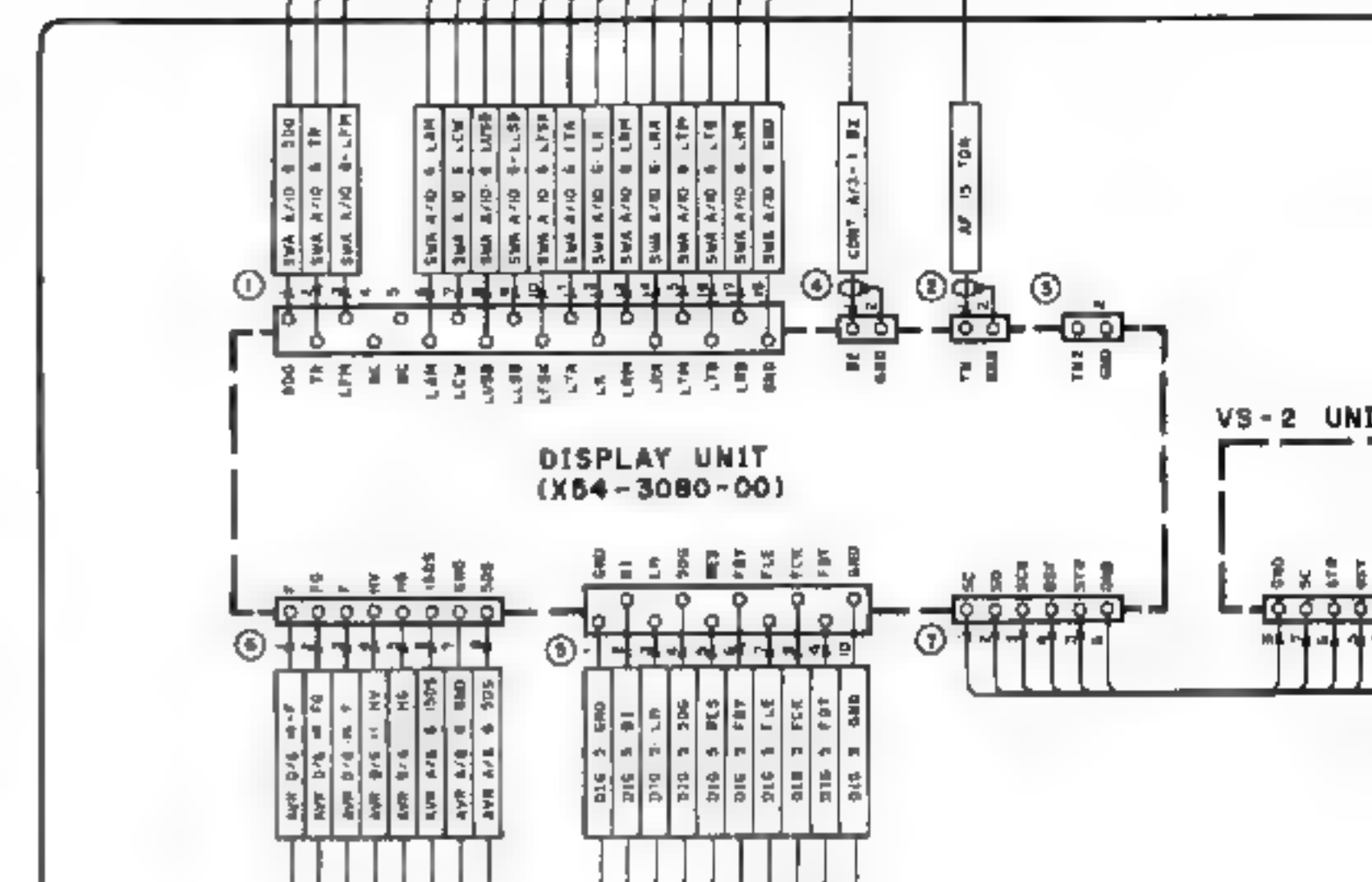
SW UNIT (B) (X41-3090-00) (E/10)



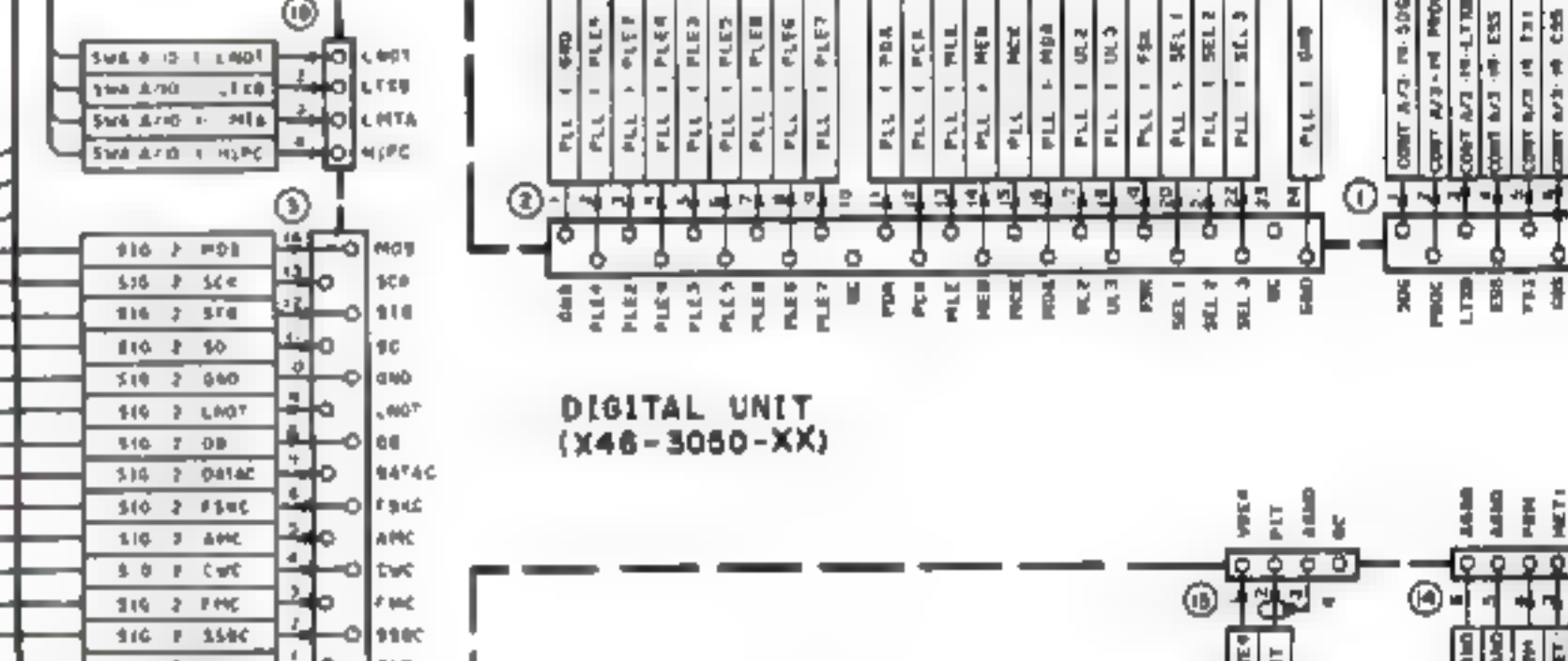
SW UNIT (B) (X41-3090-00) (F/10)



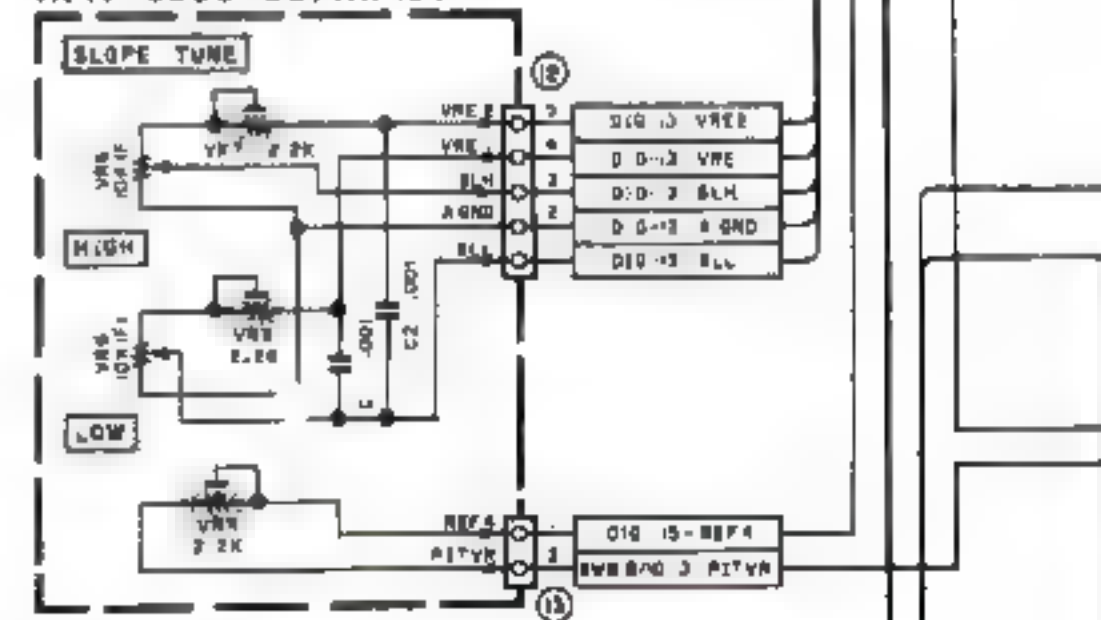
DISPLAY UNIT (X54-3080-00)



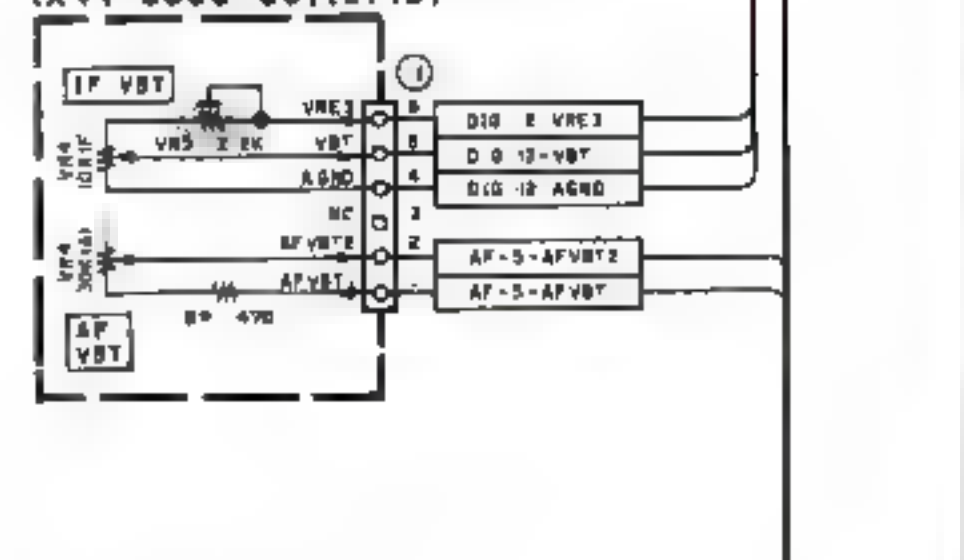
DIGITAL UNIT (X46-3080-XX)

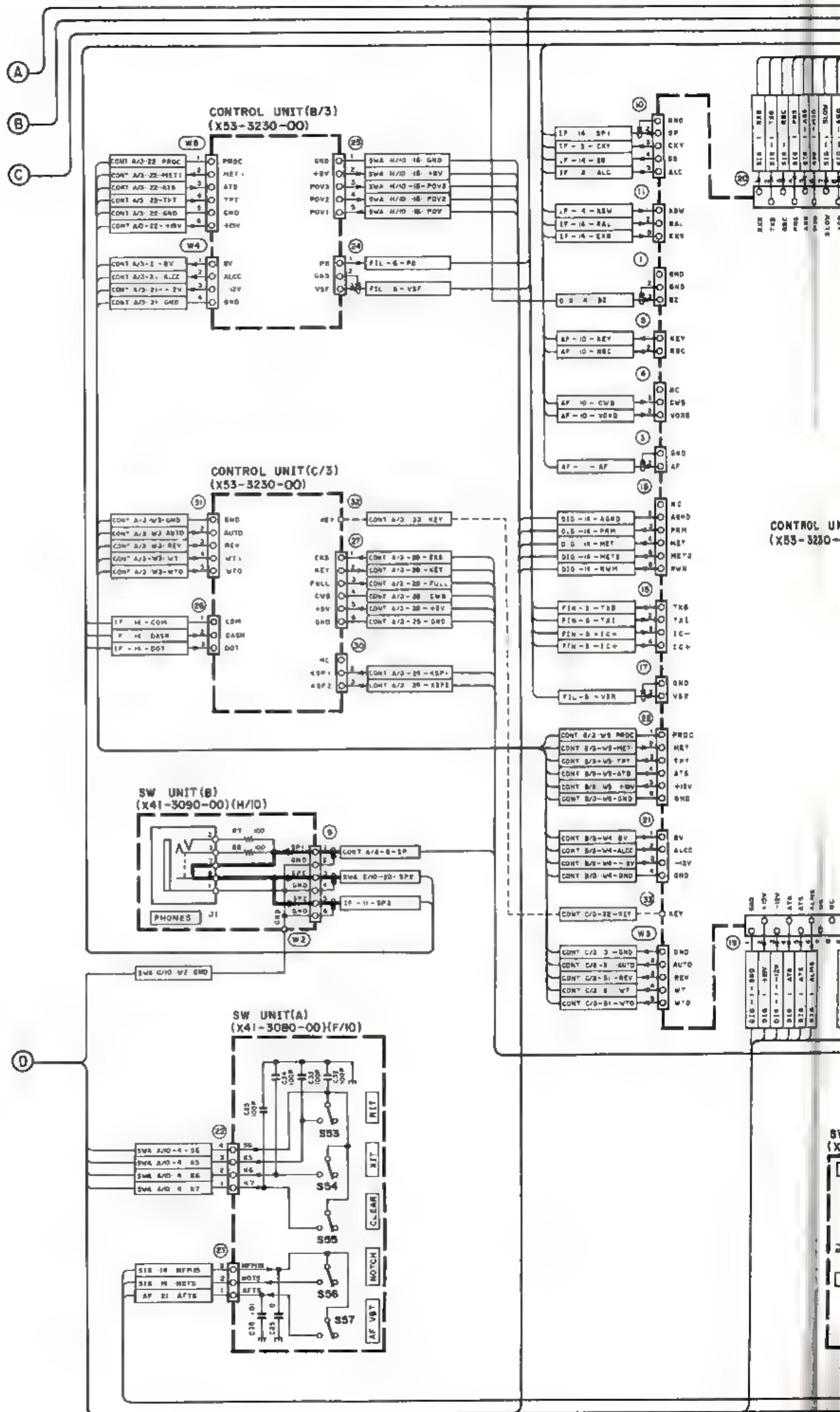


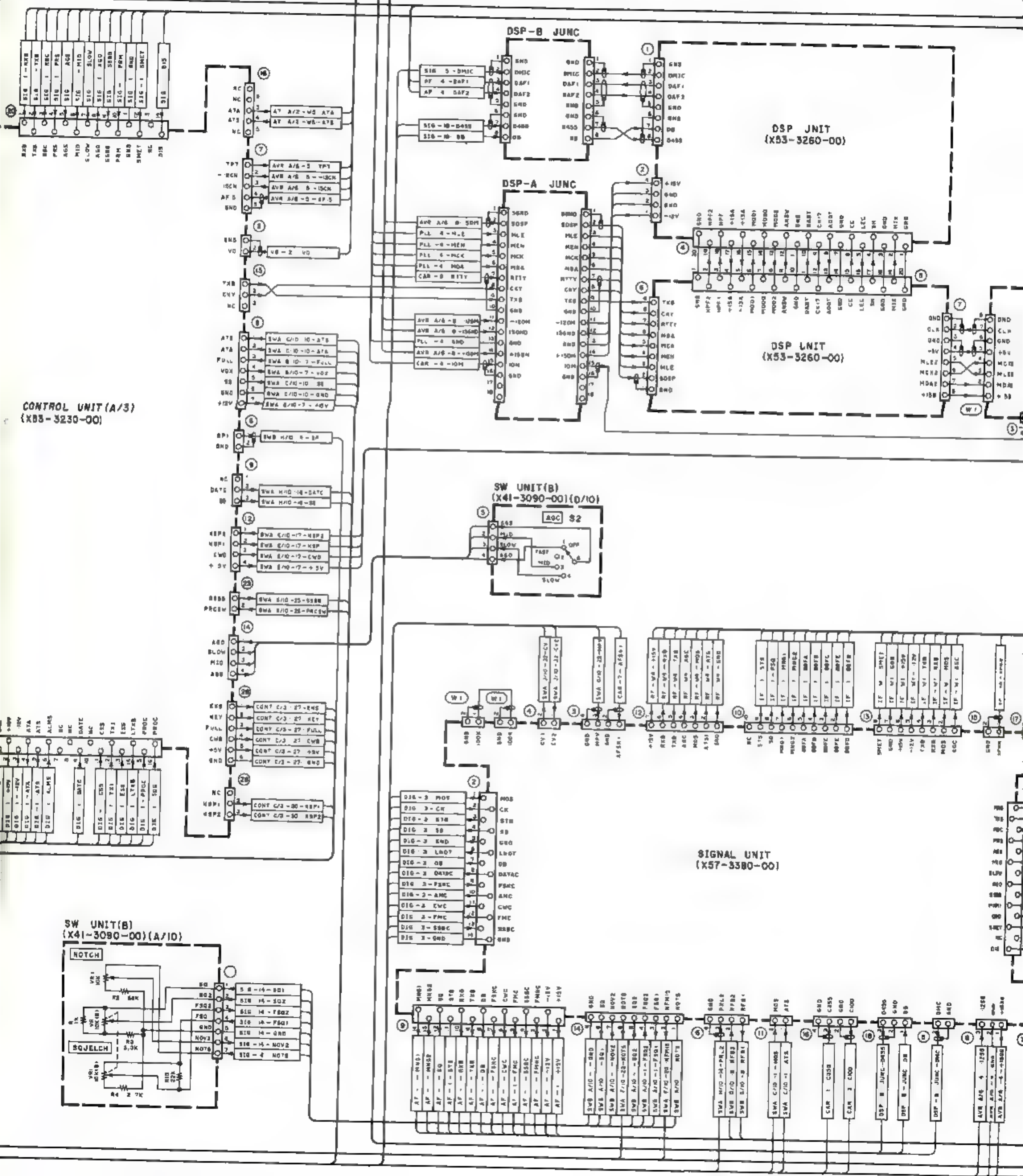
SW UNIT (B) (X41-3090-00) (K/10)

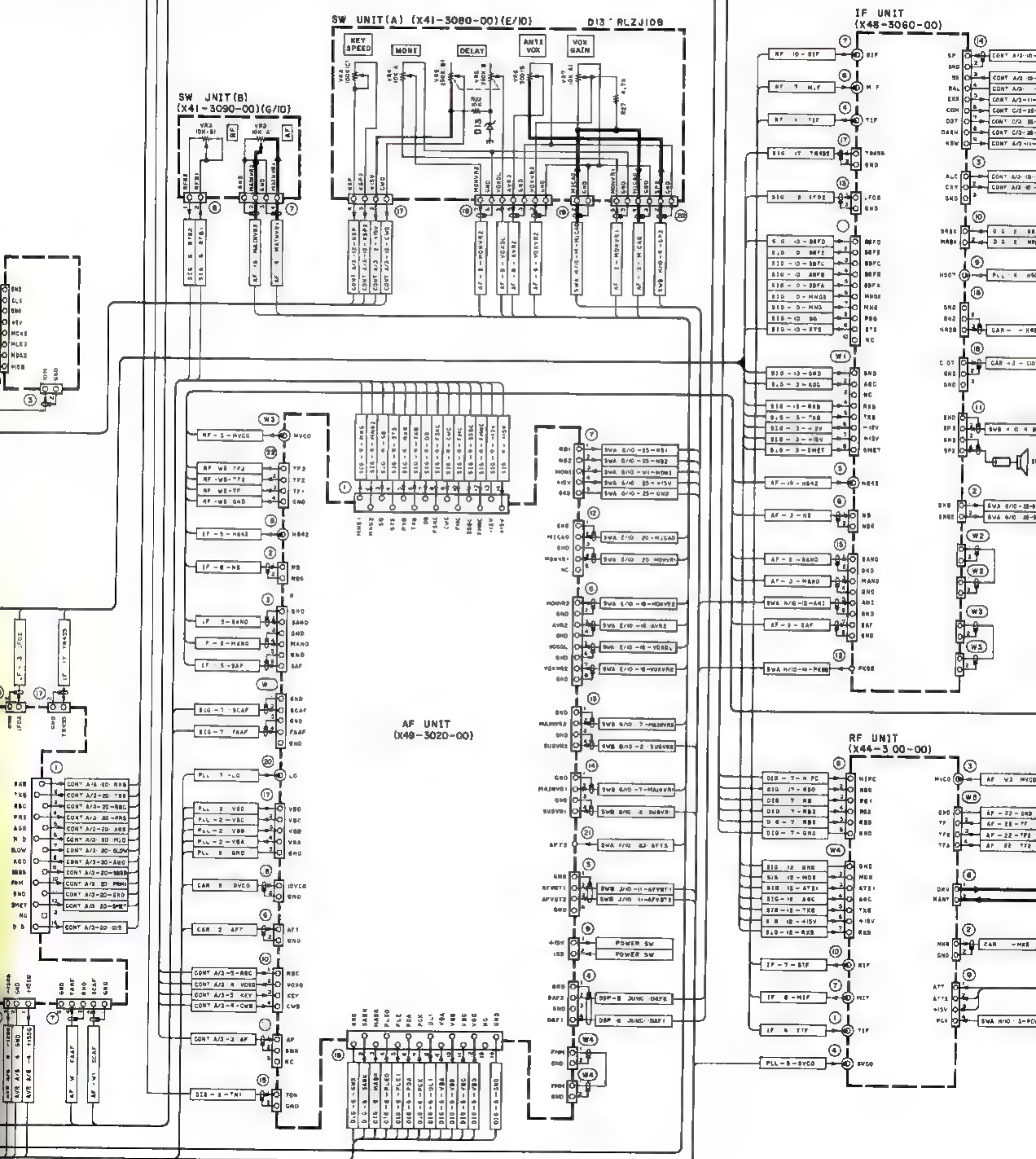


SW UNIT (B) (X41-3090-00) (J/10)









2

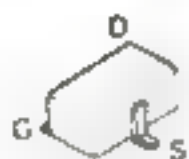


TS-950S/SD PC BOARD VIEWS

2SA1162
2SC2712
2SC2714
2SC3324
DTA114EK
DTA144EK
DTC114EK
DTC114TK
DTC144EK



2SK210



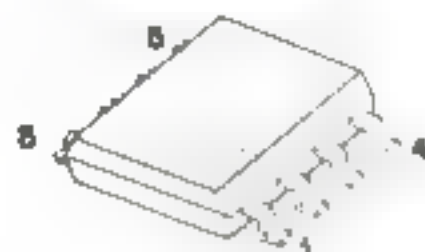
2SK508NV



2SA1204



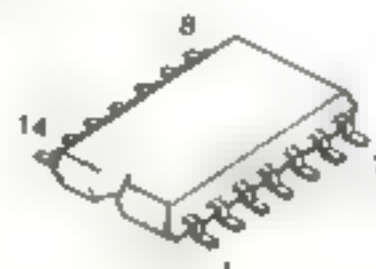
NJM2904M



NJM4558M



TC4001BF
TC4011BF
TC4013BF

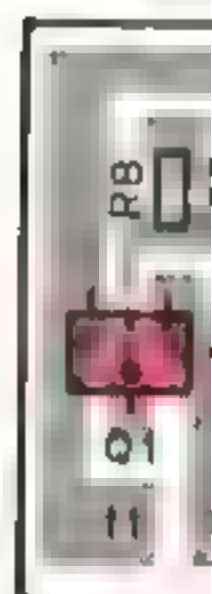


VOX (X)



IC1 NJM
D1,2 DA

FM MIC



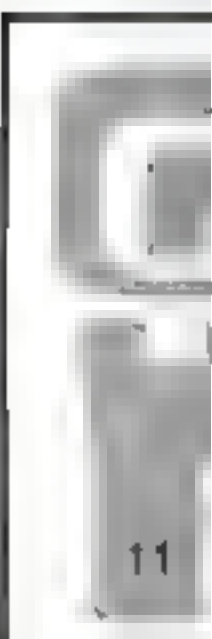
IC1 NJM

VCO1 (X)



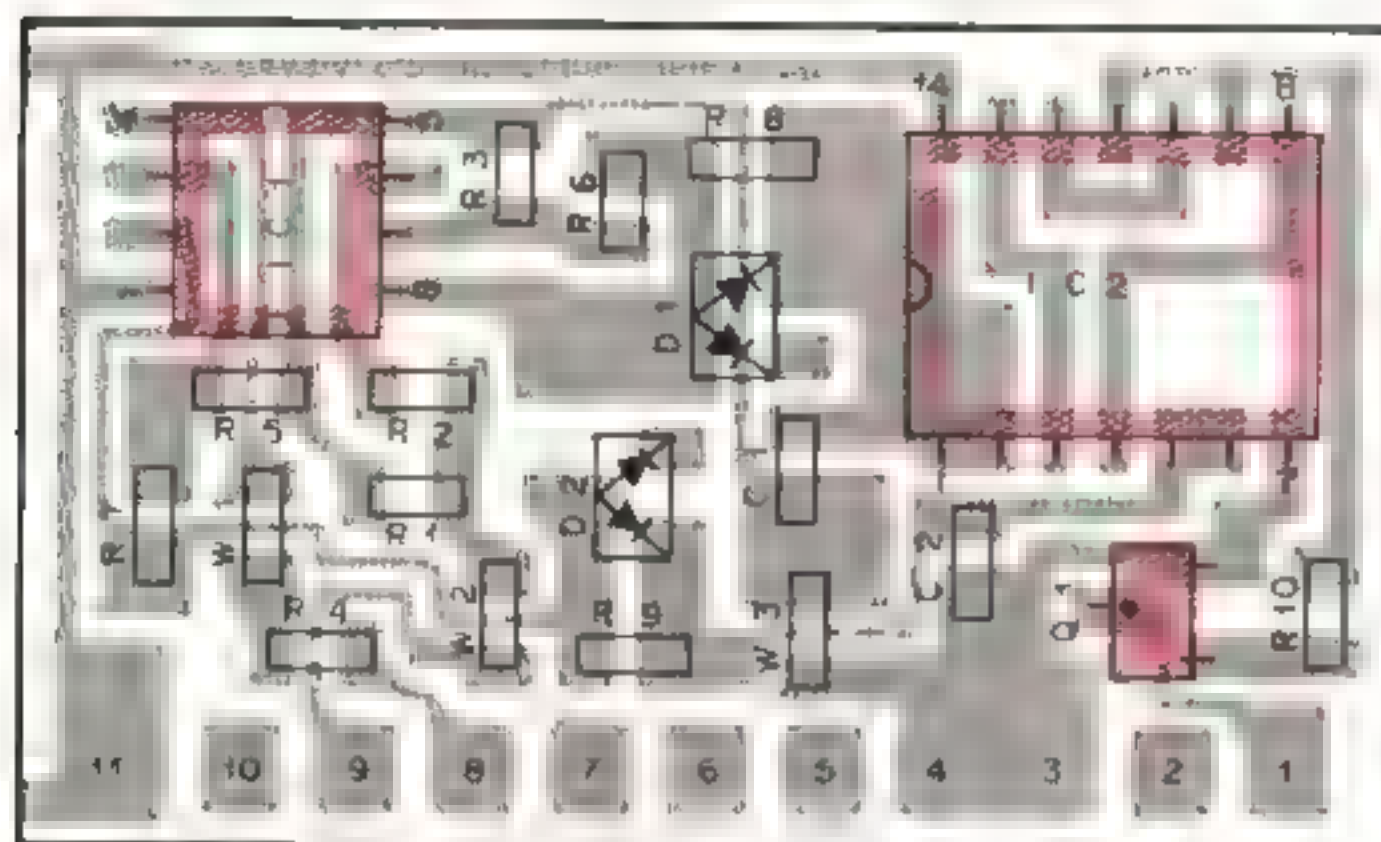
Q1 : 2SK2

LPF (X5)



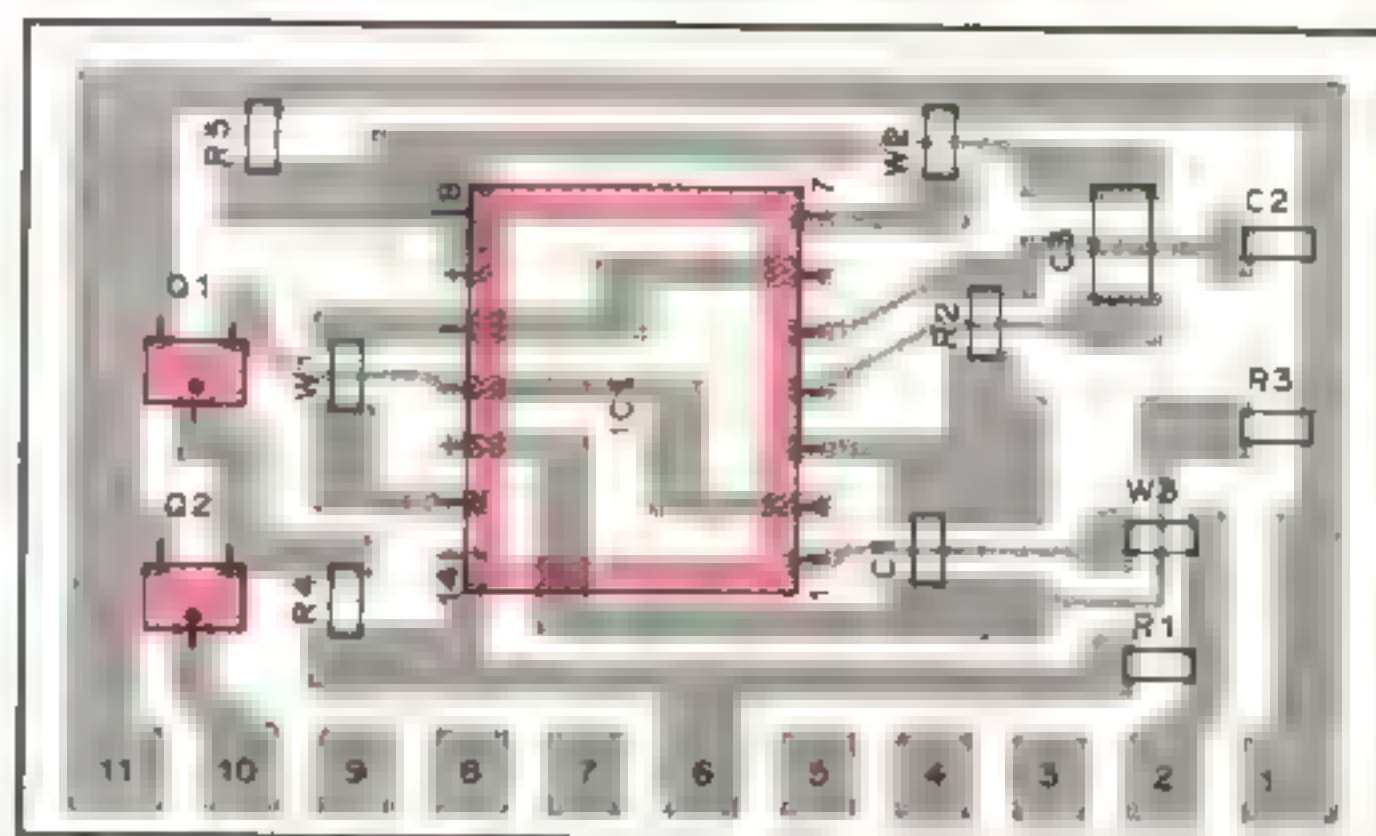
Q1-3 : 2S

VOX (X59-1080-01) Component side view



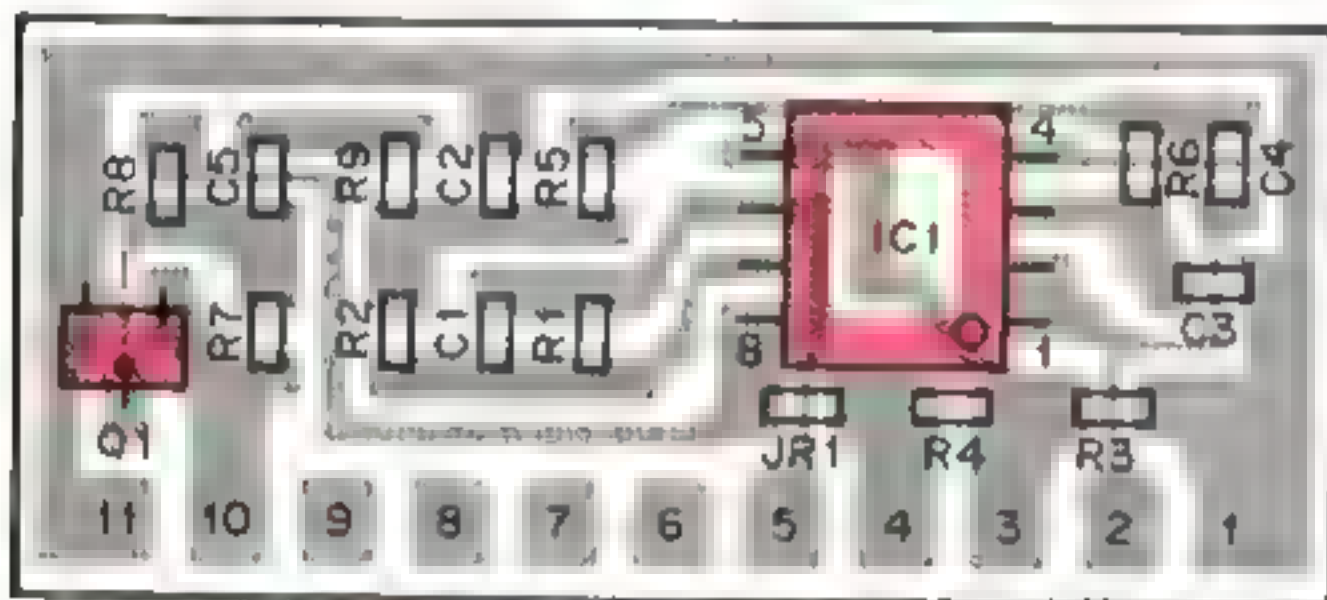
IC1 : NJM2904M IC2 : TC4001BF Q1 : 2SC2712(Y)
D1, 2 : DAP202(K)

NB2 (X59-3350-00) Component side view



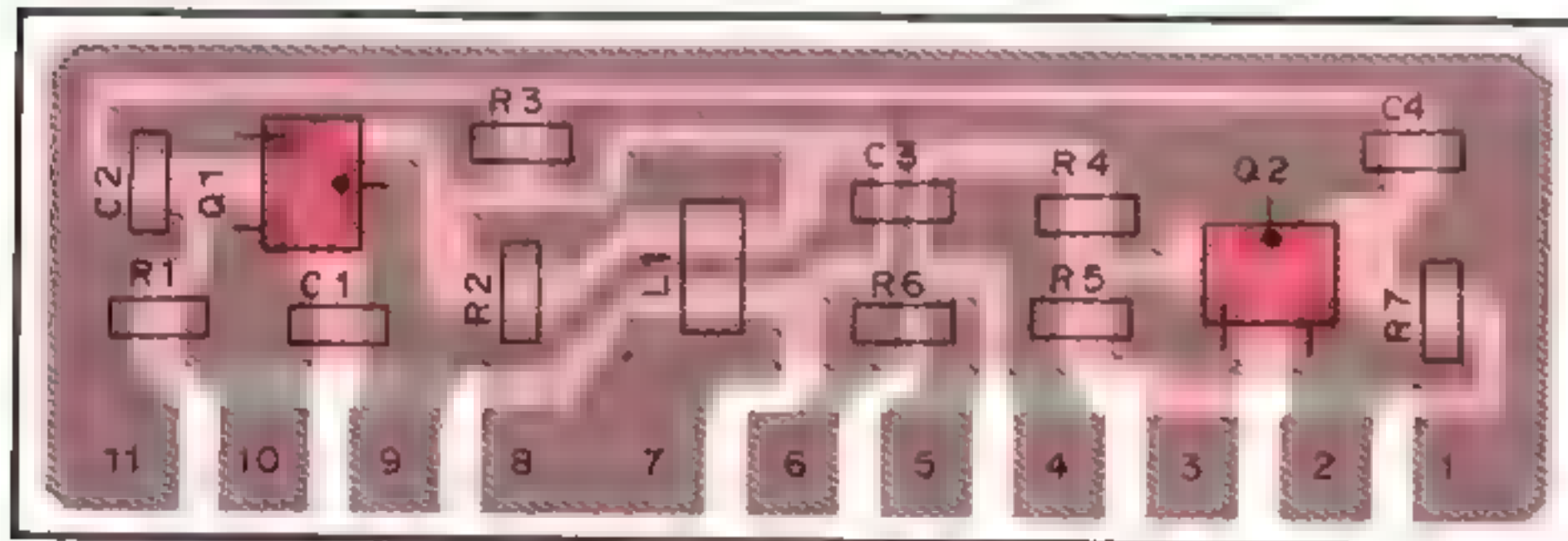
IC1 : TC4011BF Q1, 2 : DTC114EK

FM MIC AMP (X59-3000-03) Component side view



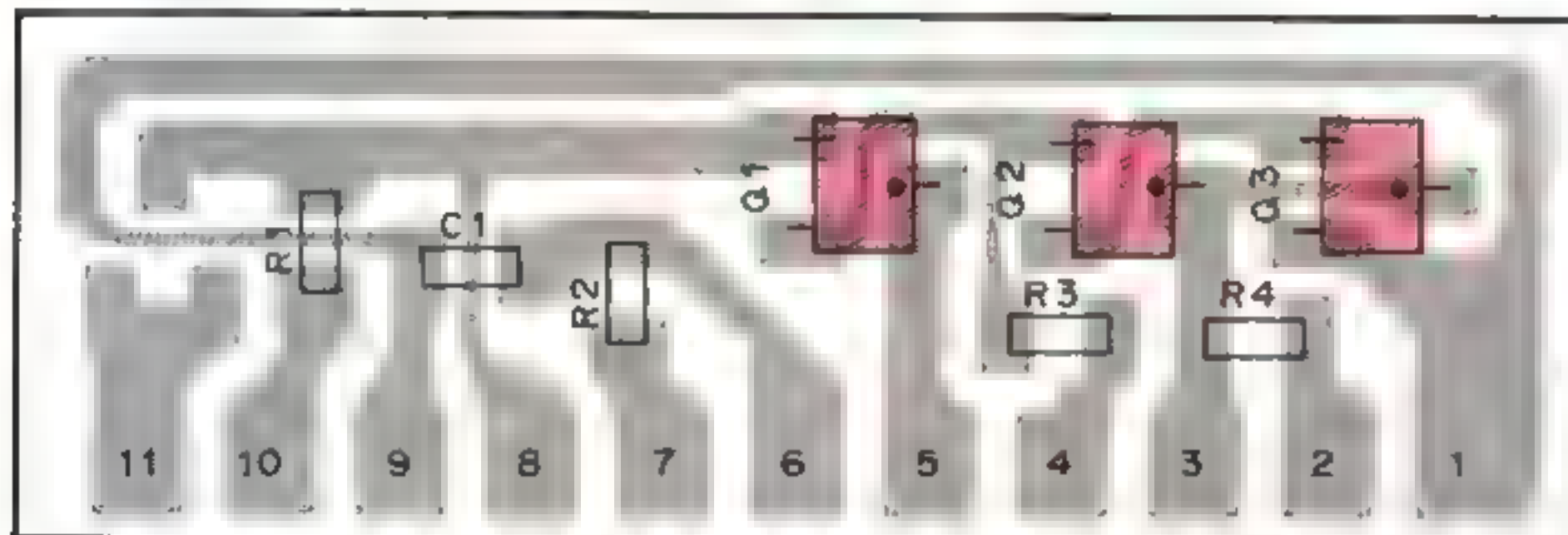
IC1 : NJM4558M Q1 : 2SC2712(Y)

VCO1 (X59-3440-00) Component side view



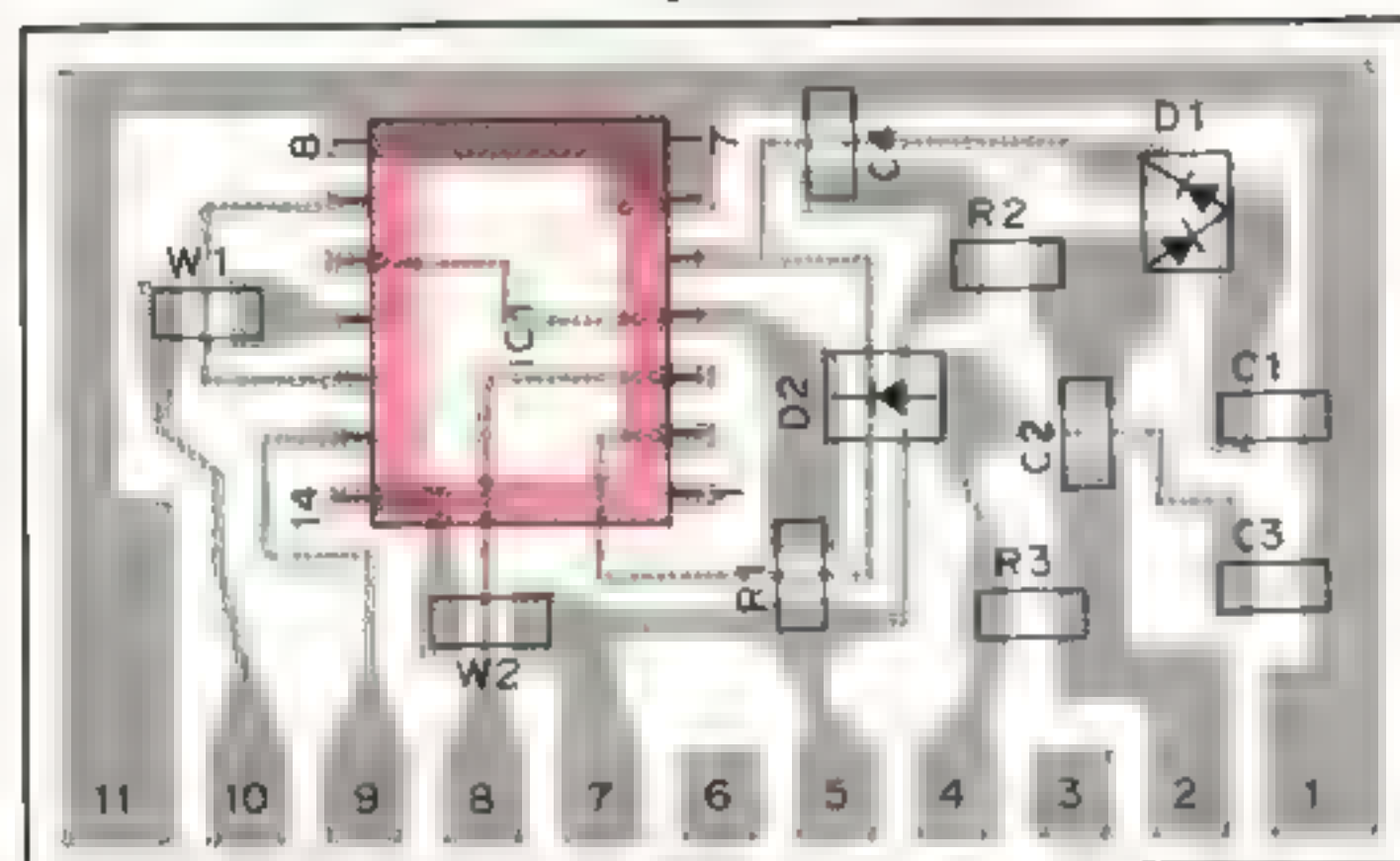
Q1 : 2SK210(GR) Q2 : 2SC2714(Y)

LPF (X59-3450-XX) Component side view



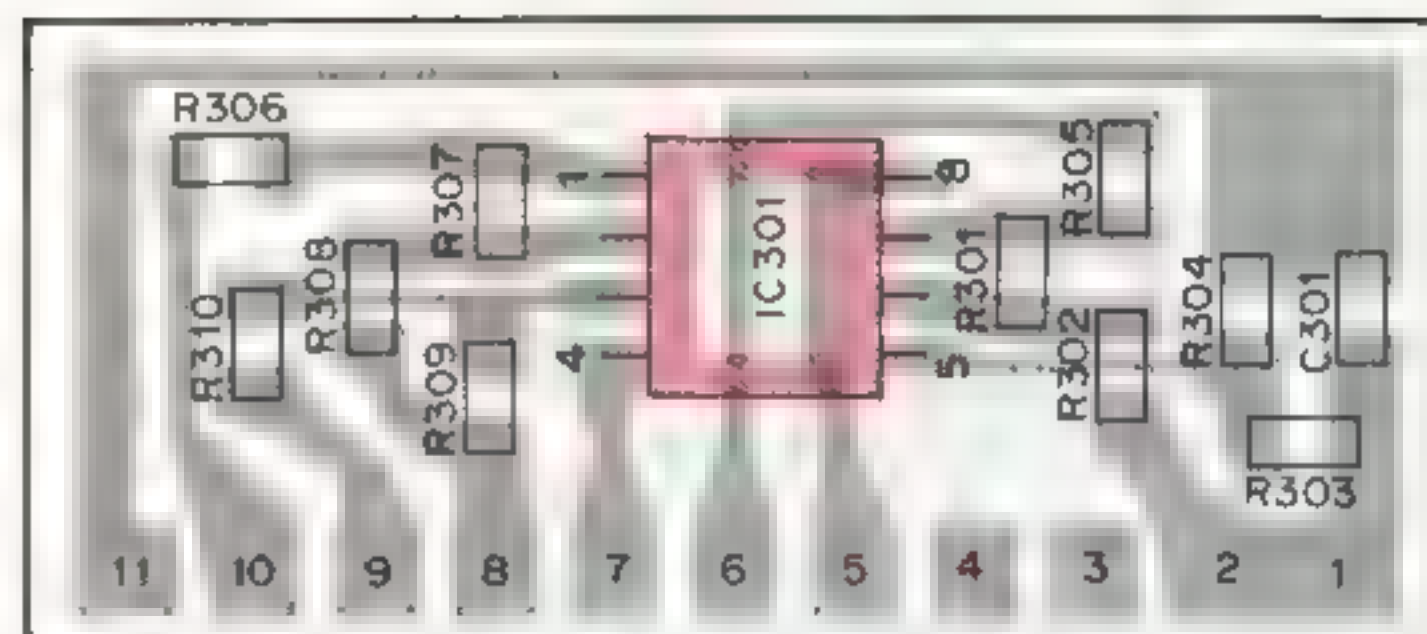
Q1-3 : 2SC3324(G)

MKR (X59-3640-00) Component side view



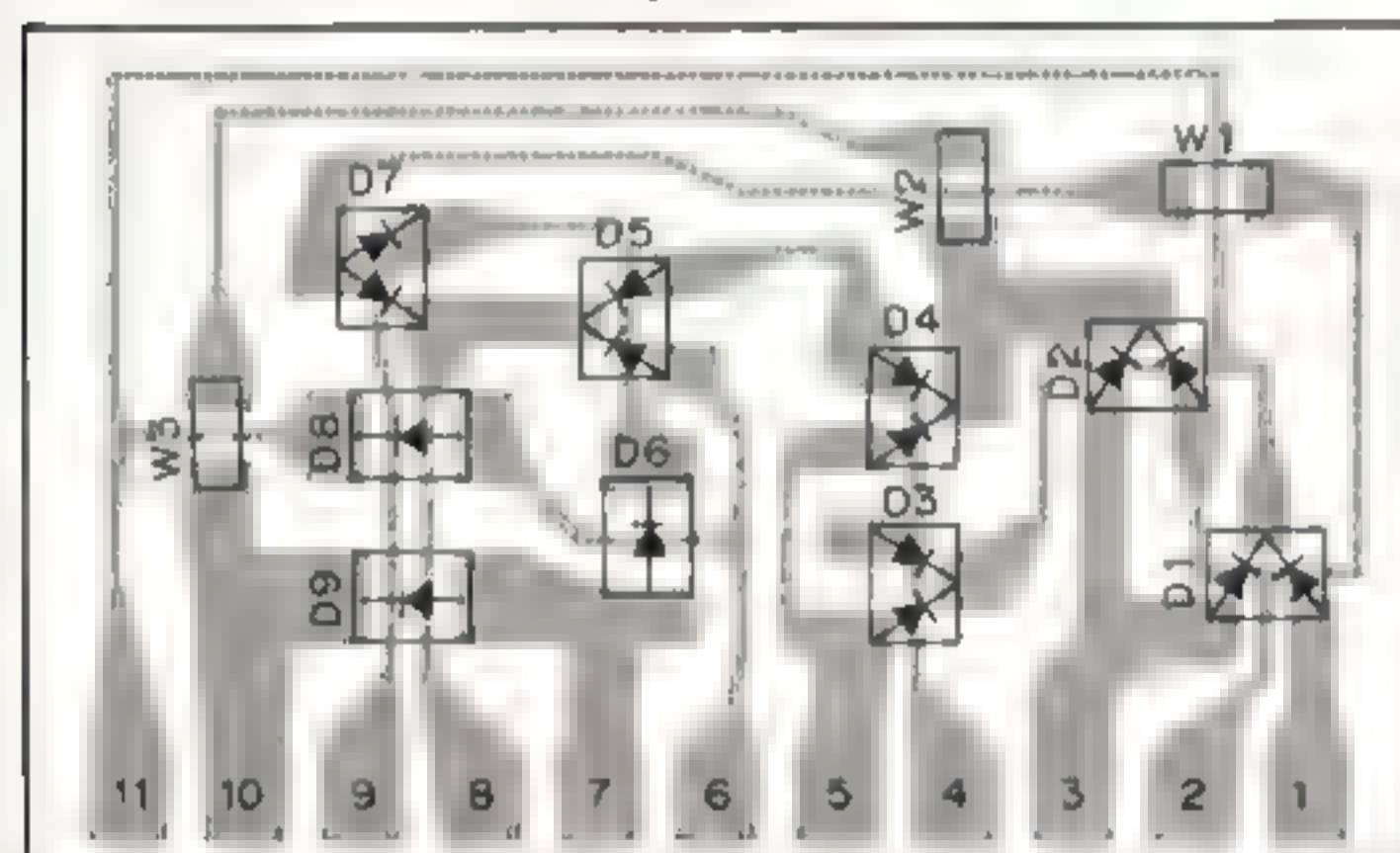
IC1 : TC4013BF D1 : DA204K D2 : RLS73

MAP (X59-3670-00) Component side view



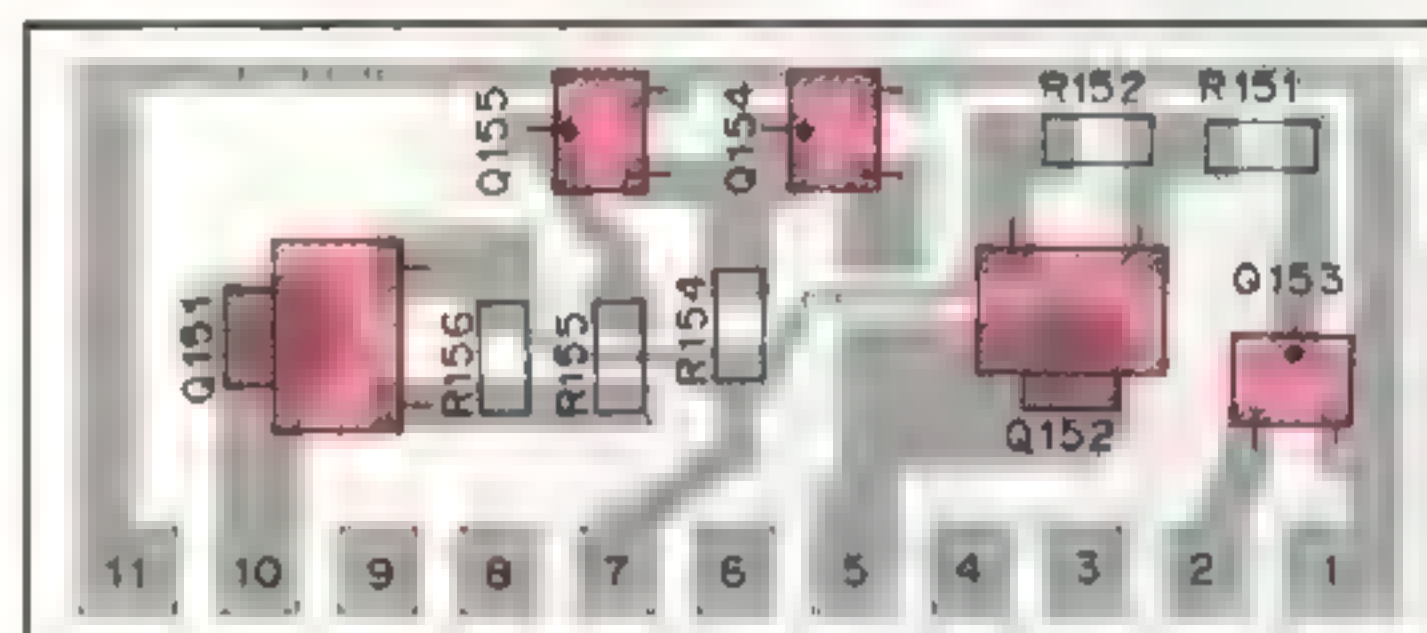
IC301 : NJM4558M

SFT (X59-3650-00) Component side view



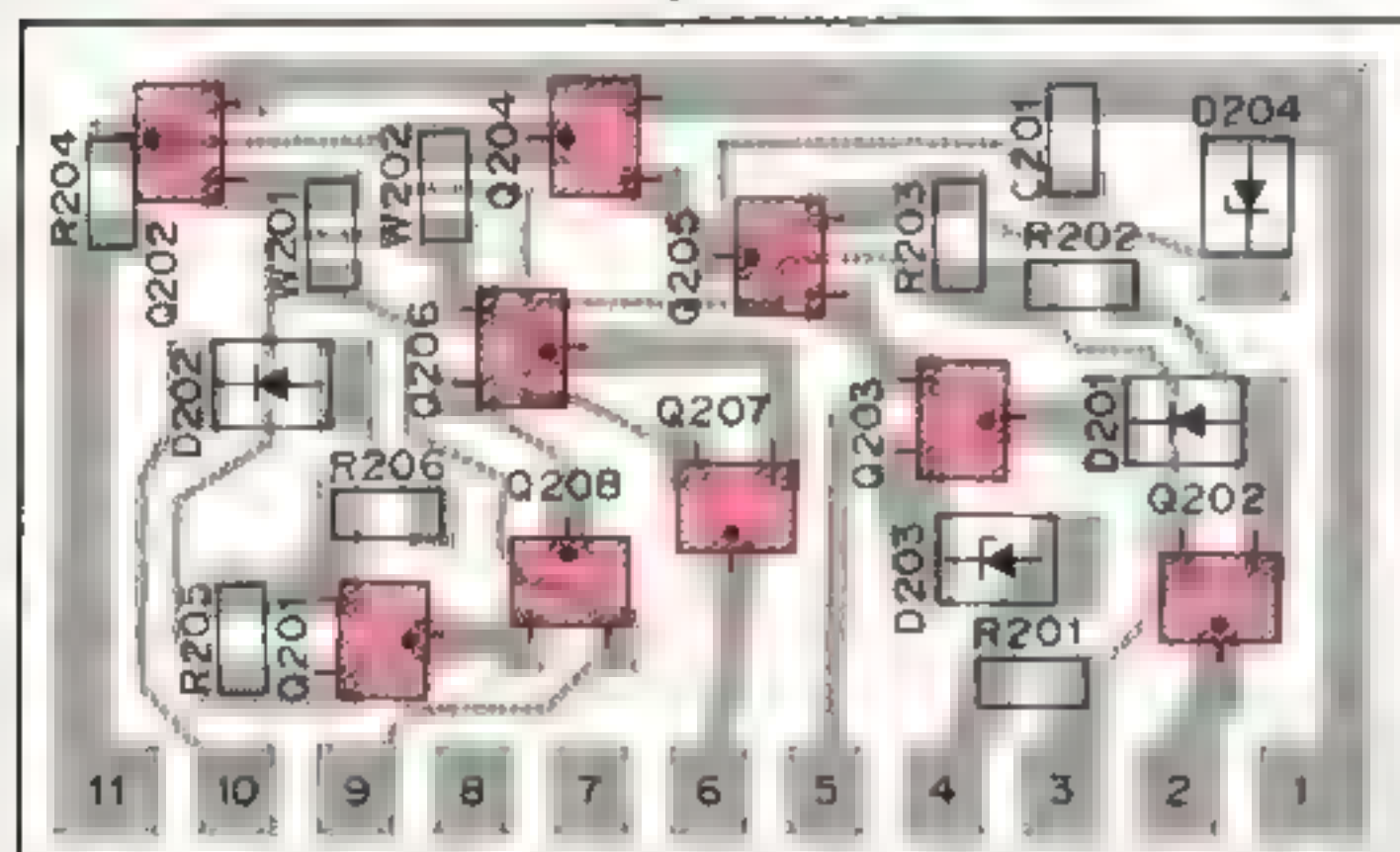
D1-5 : DAN202(K) D6, 8, 9 : RLS73 D7 : DAP202(K)

TRX (X59-3680-00) Component side view



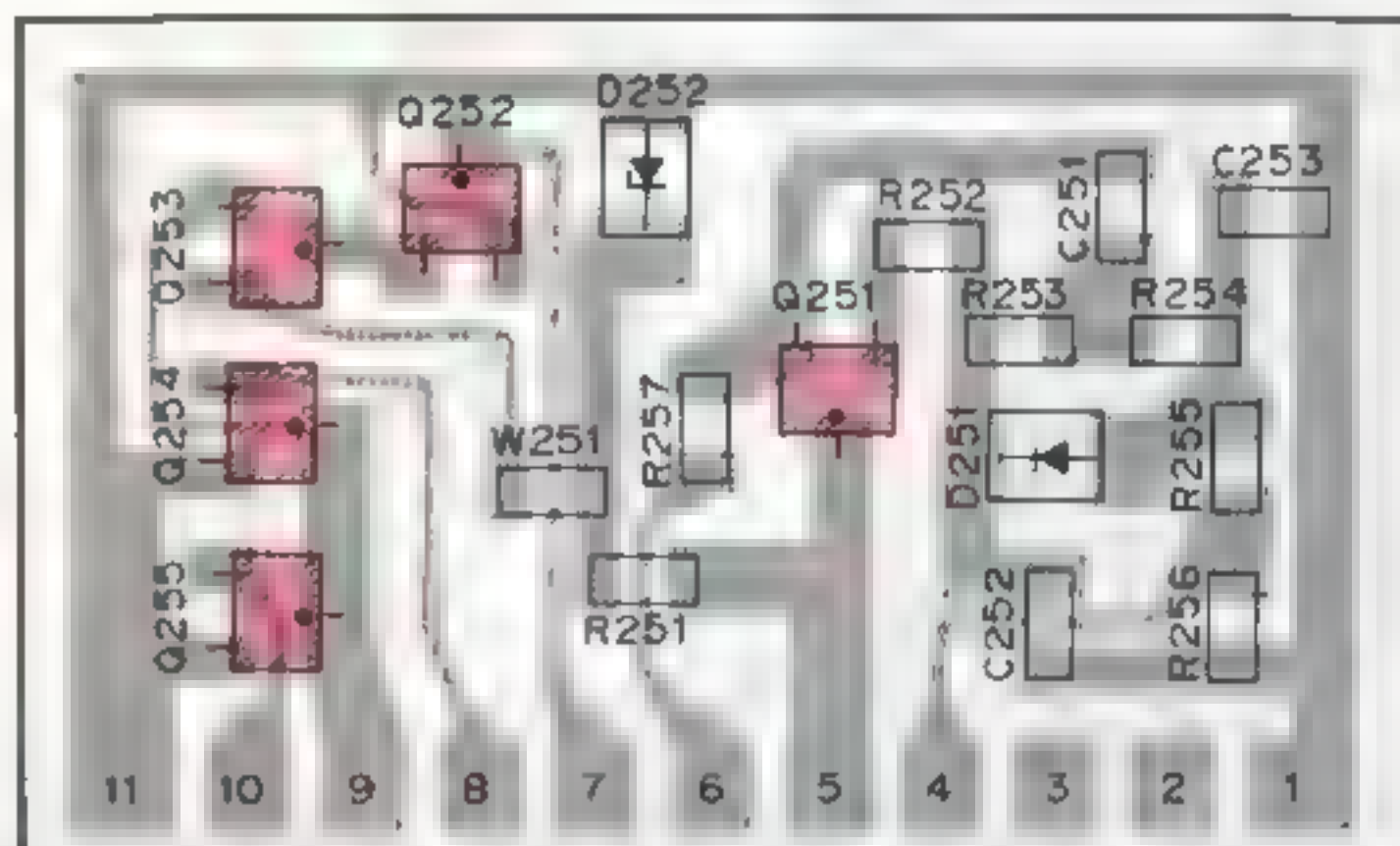
Q151, 152 : 2SA1204(Y) Q153-155 : DTC114TK

CWT (X59-3660-00) Component side view



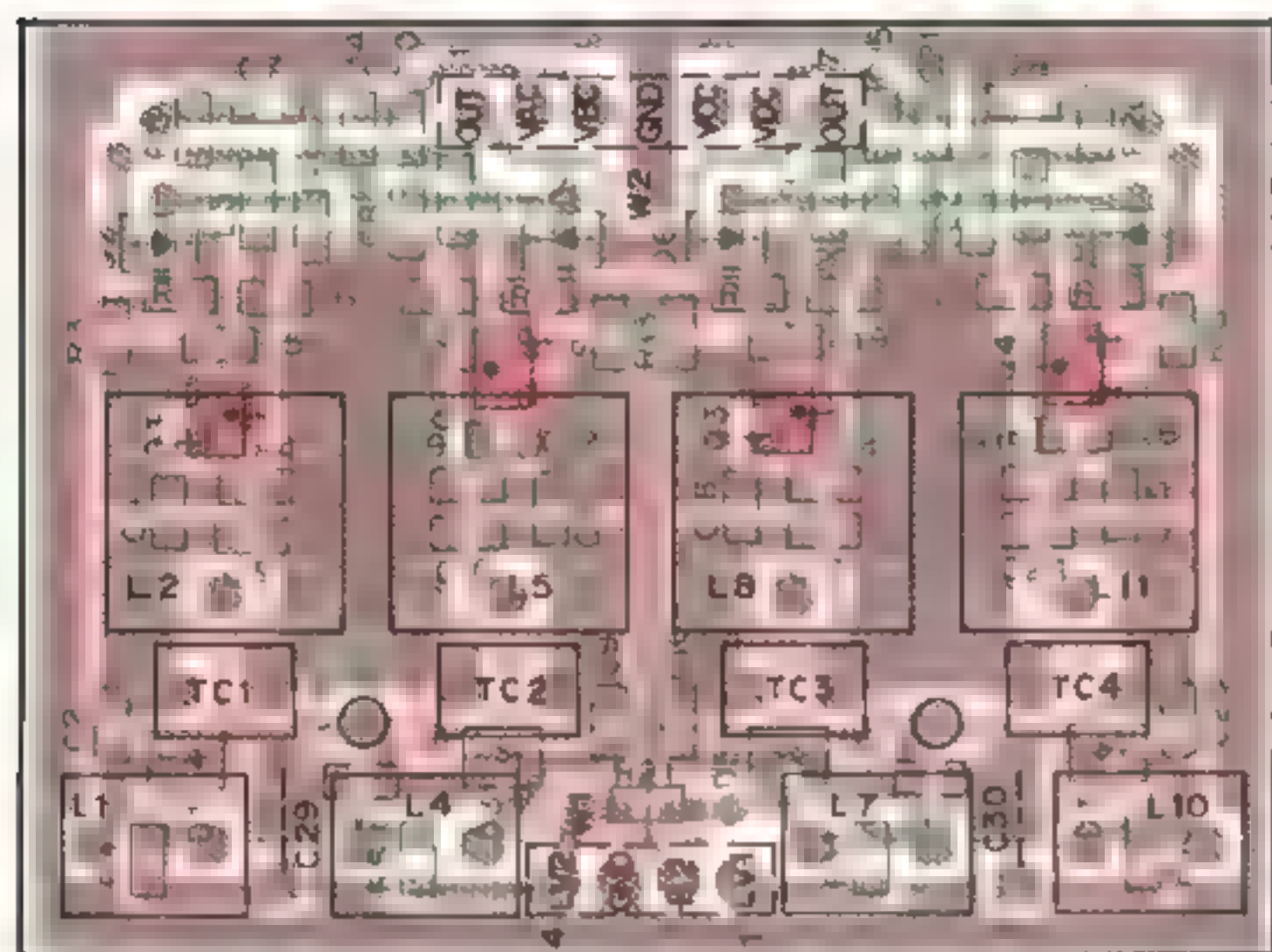
Q201 : 2SA1162(Y) Q202, 205, 207 : DTA144EK
Q203, 204, 206 : DTC144EK Q208 : DTC114TK
D201, 202 : RLS73 D203 : RLZJ3.6B D204 : RLZJ4.7B

ALC (X59-3700-00) Component side view



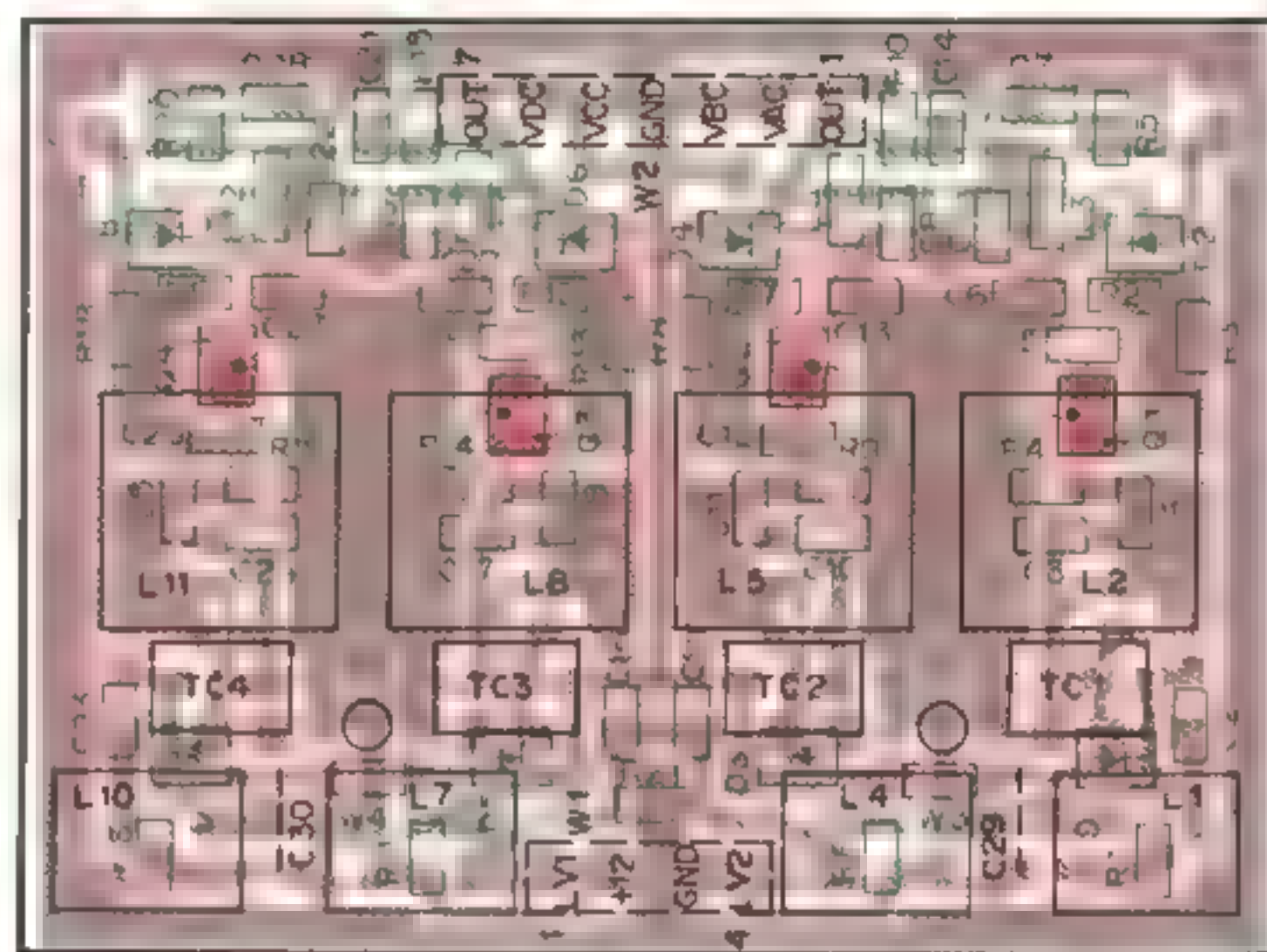
Q251 : 2SC2712(Y) Q252, 254, 255 : DTC144EK Q253 : DTA144EK
D251 : RLS73 D252 : RLZJ12B

VCO (X58-3630-XX) Component side view

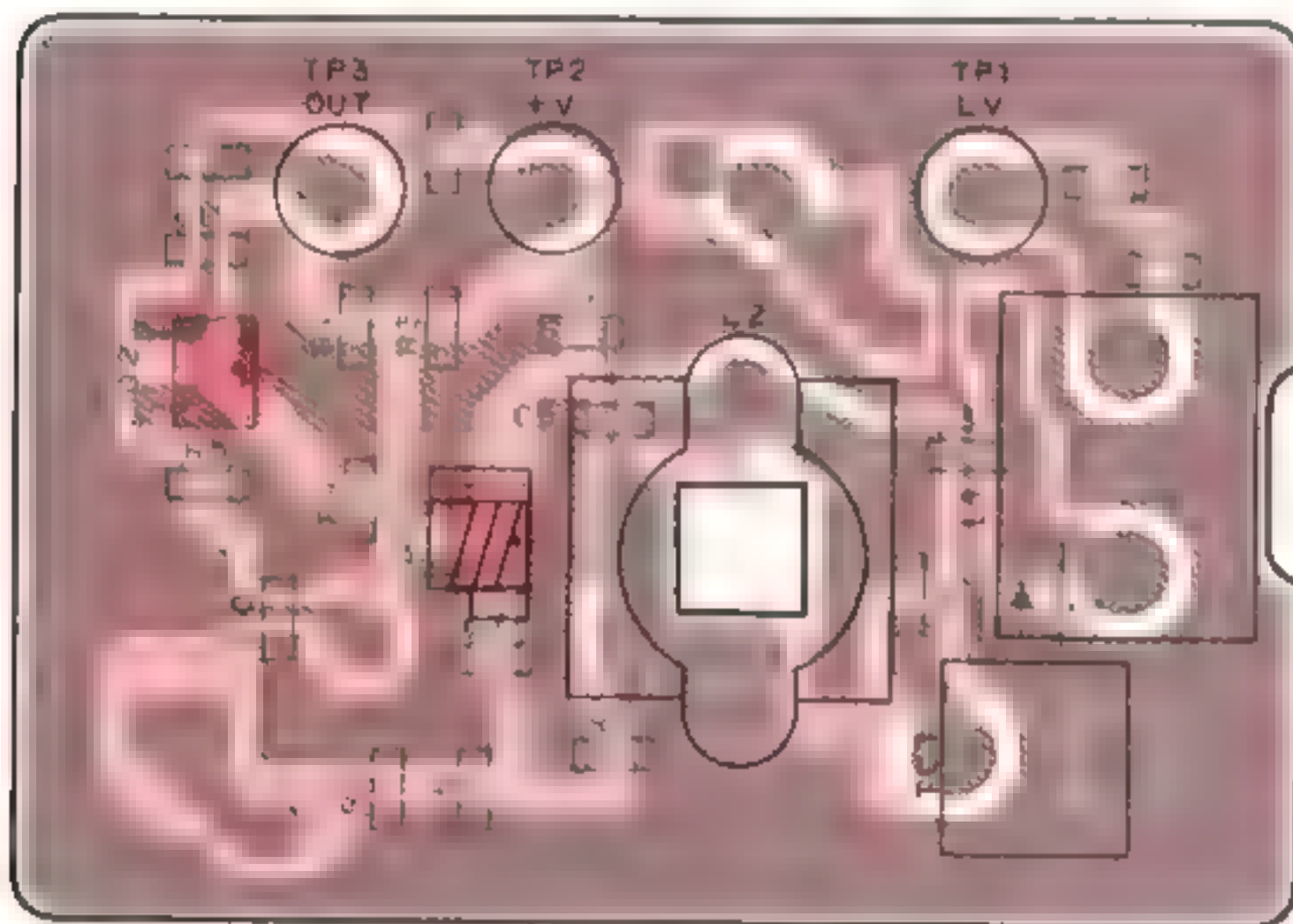


Q1-4 : 2SK210(GR) D1, 3, 5, 7 : 1SV166 D2, 4, 6, 8 : RLS135

VCO (X58-3630-XX) Foil side view

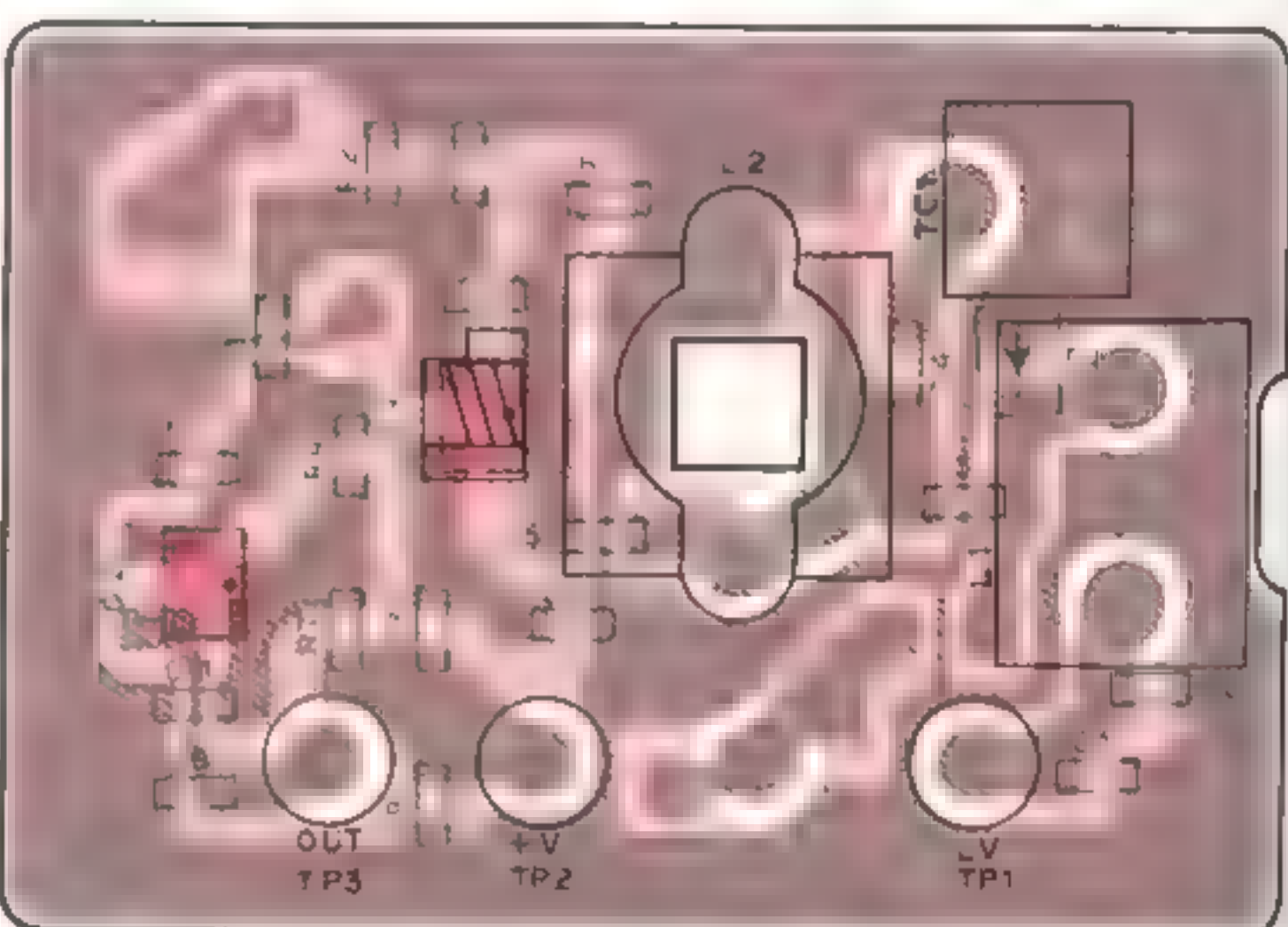


VCO2 (X59-3390-03) Component side view

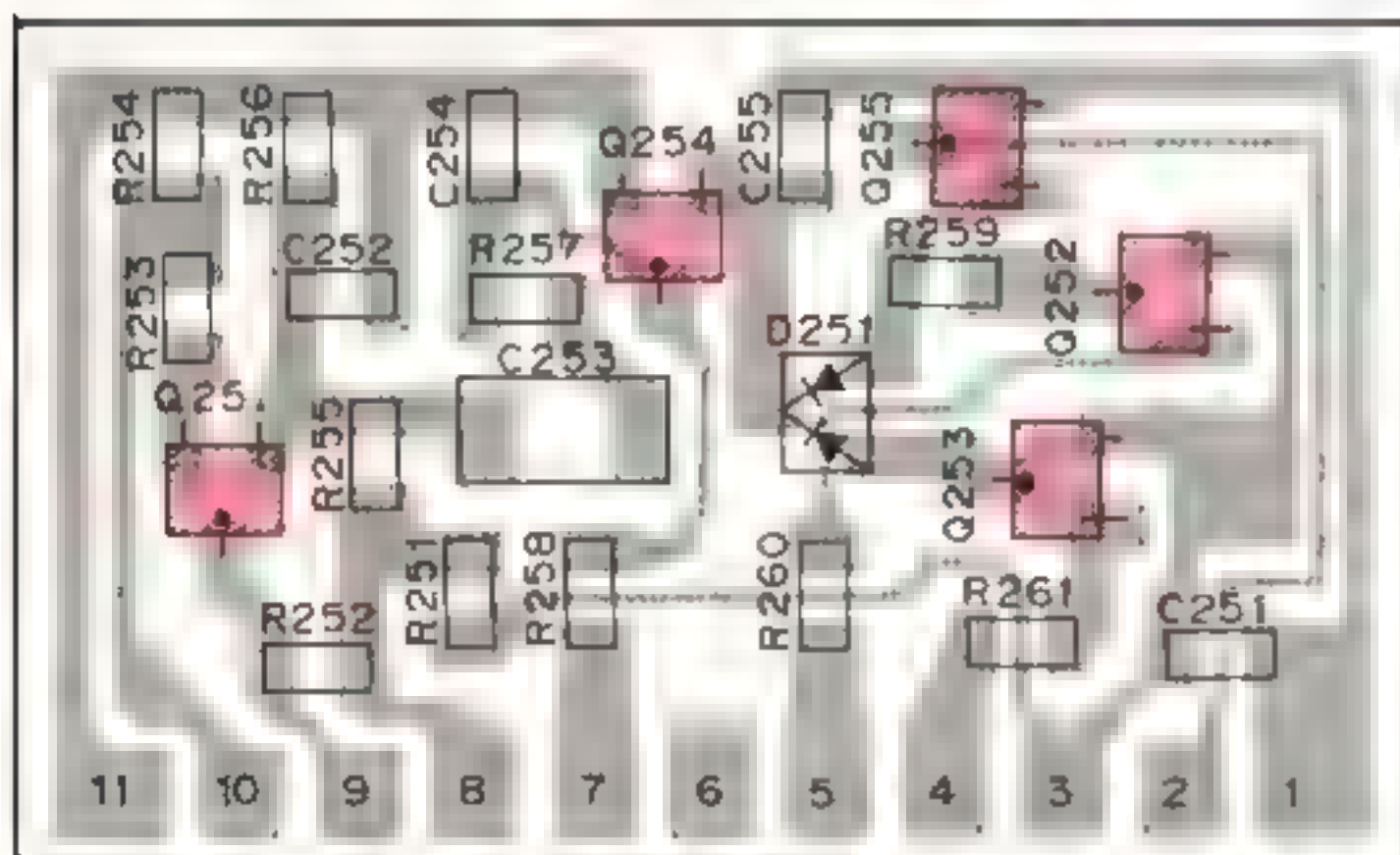


Q1 2SK508NV(K52) Q2 2SC2714(Y) D1 1SV164

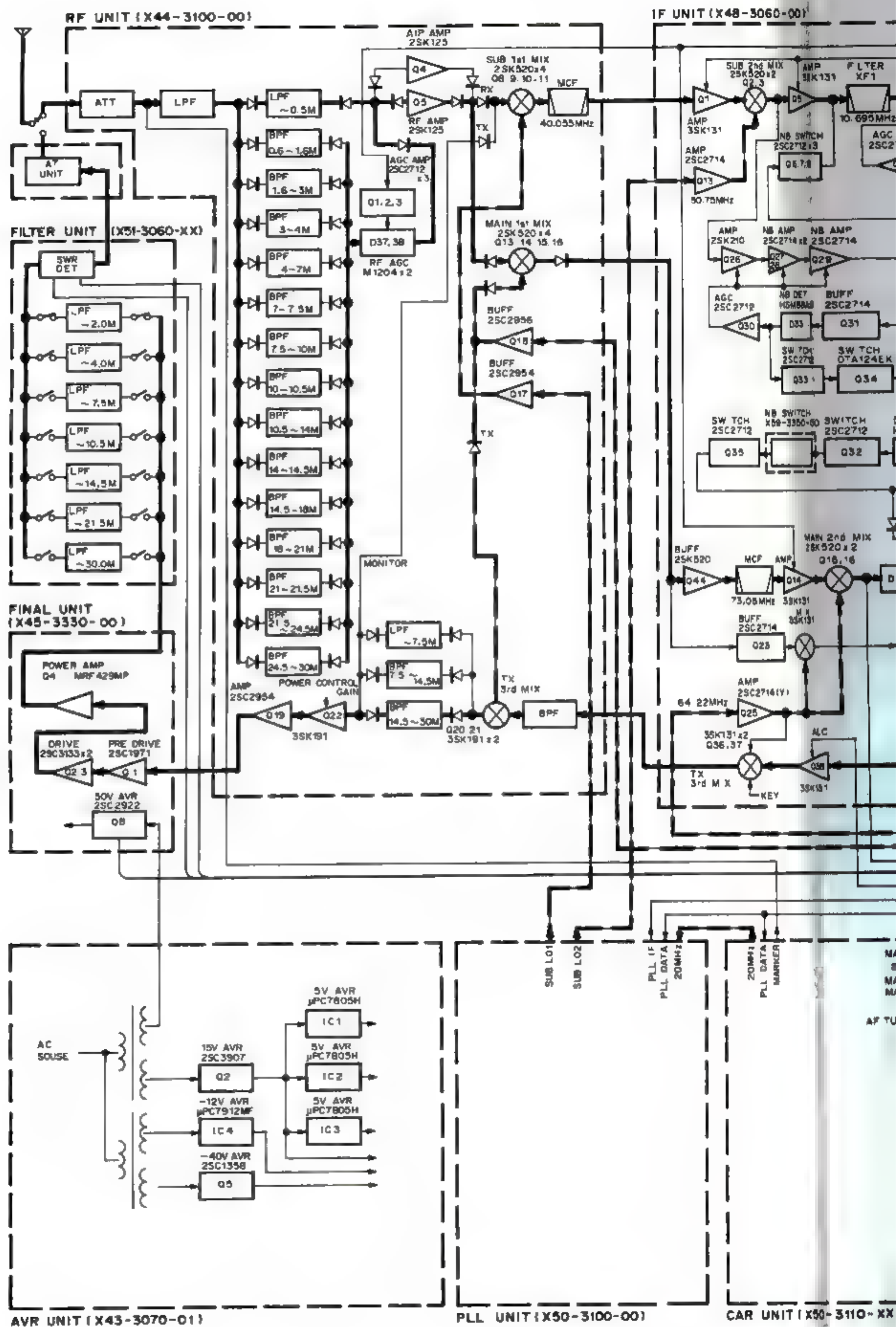
VCO2 (X58-3390-03) Foil side view



MIC AMP (X59-3710-00) Component side view

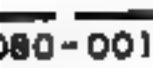


Q251 : 2SC3324(G) Q252, 253 : DTA114EK Q254 : DTC114TK
Q255 : DTC114EK D251 : DAN202(K)



1-3060-00)

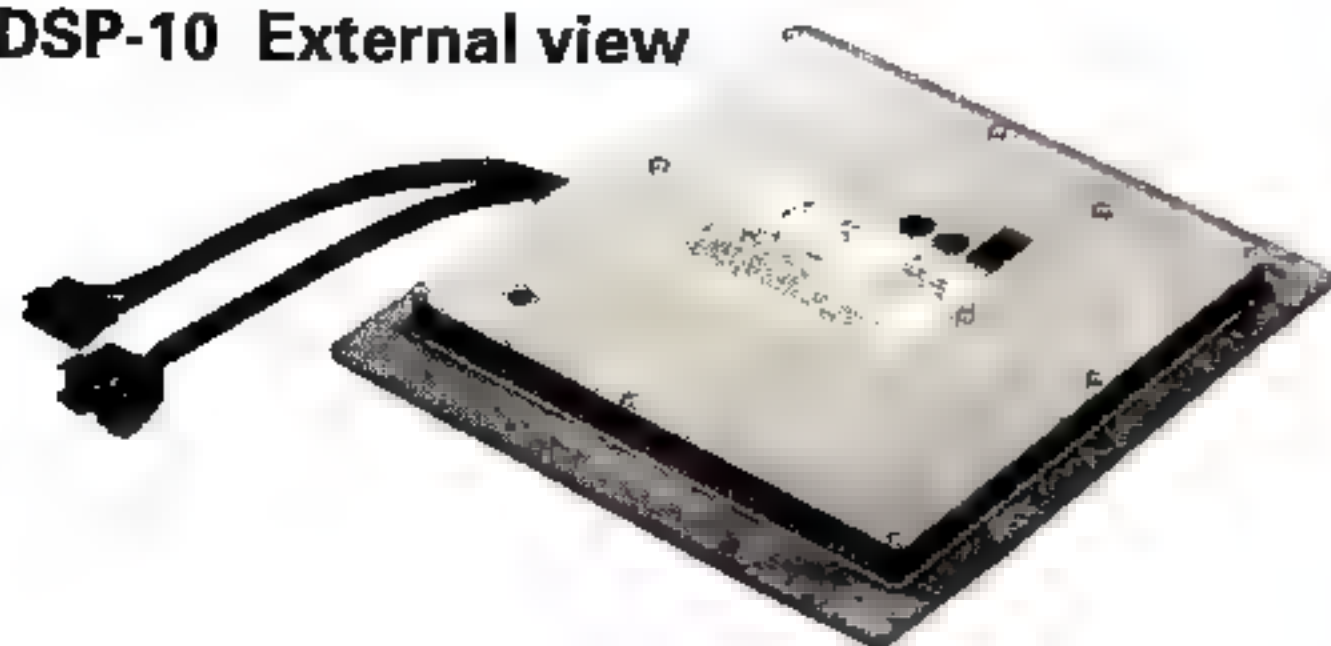




TS-950S/SD

DSP-10 (DIGITAL SIGNAL PROCESSOR) / SO-2 (TCXO UNIT) / YG-455S-1 (SSB FILTER)

DSP-10 External view



DSP-10 Specifications

Dimensions (W x D x H) 220 x 200 x 28 (mm)
..... 8-21/32" x 7-7/8" x 1-3/32"
Weight 1 kg (2.2 lbs)

DSP-10 Parts list

| Ref. No. | New | Parts No. | Description |
|----------|-----|-------------|---------------------------|
| | * | B40-7612-04 | Model name plate |
| | * | B42-3343-04 | Serial label |
| | * | B50-8352-00 | Instruction manual |
| | * | H01-8297-04 | Item carton box |
| | * | H12-1420-03 | Packing fixture |
| | | H25-0029-04 | Protection bag |
| | | N89-3008-45 | Binding head tapite screw |
| | * | X53-3260-00 | DSP unit |

SO-2 External view



SO-2 Specifications

Oscillating frequency 20 MHz
Temperature stability $\pm 5 \times 10^{-7}$ (-10°C to $+50^{\circ}\text{C}$)
Frequency stability (Long term) $\pm 1 \times 10^{-6}$ /year
Output 1 V peak-to-peak (20 k Ω /5 pF)

SO-2 Parts list

| Ref. No. | New | Parts No. | Description |
|----------|-----|-------------|--------------------|
| | * | B50-8314-08 | Instruction manual |
| | | L77-1394-15 | TCXO |

YG-455S-1 External view



YG-455S-1 Specifications

Center frequency 455.0 kHz
Pass band width 2.4 kHz (-6dB)
Attenuation band width 4.1 kHz (-60dB)

SP-950 (EXTERNAL SPEAKER)

SP-950 External view



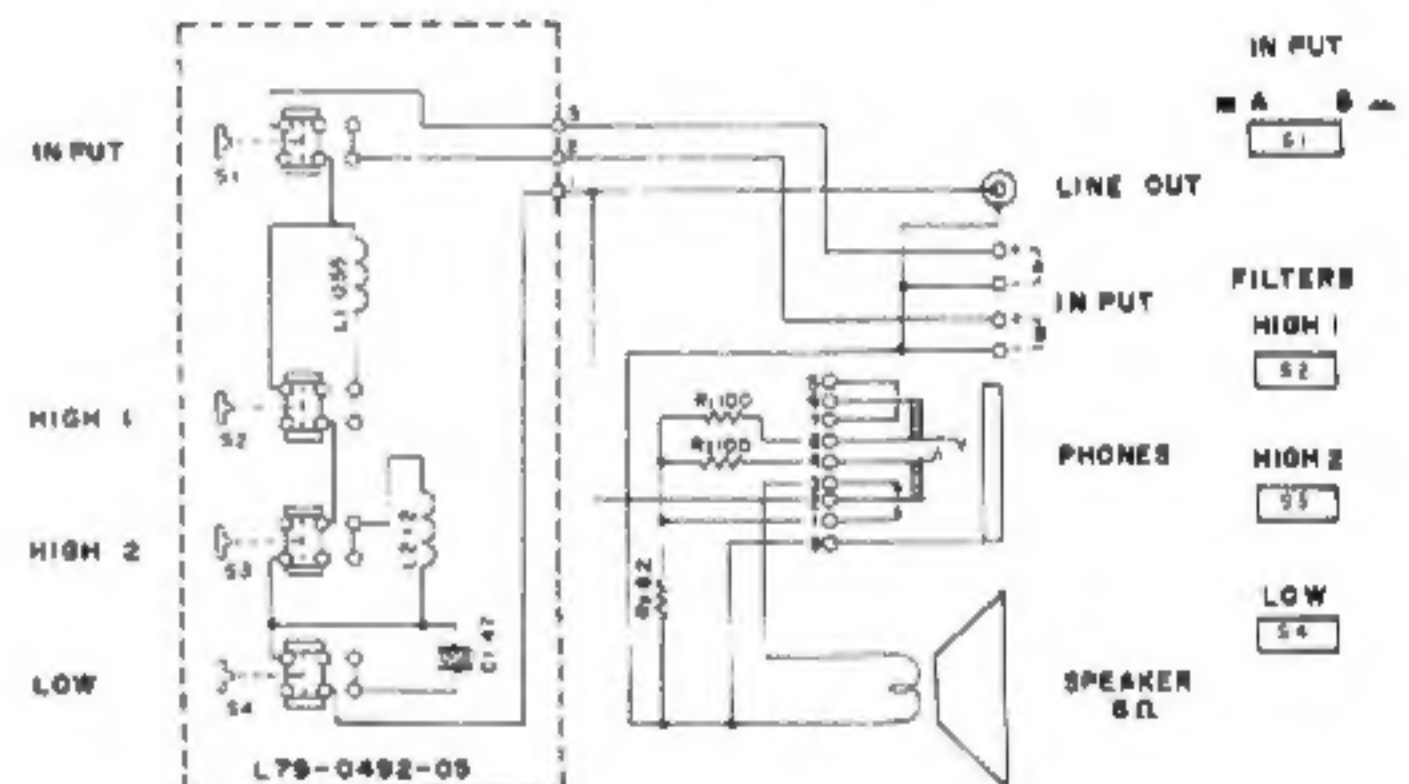
SP-950 Specifications

Speaker used 10 cm dia.
 Rated input 1 W
 Impedance 8 Ω
 Frequency response 160 Hz to 7 kHz
 Filter cut-off frequency
 HIGH1 3.0 kHz/-3dB
 HIGH2 1.2 kHz/-3dB
 HIGH1, 2 900 Hz/-3dB
 LOW 400 Hz/-3dB
 Filter attenuation -6dB/oct.
 Dimensions (W x H x D) 180 x 141 x 310 (mm)
 Weight 2.0 kg

SP-950 Parts list

| Ref. No. | New | Parts No. | Description |
|----------|-----|-------------|---------------------------------------|
| | | A01-1052-02 | Metallic cabinet (Bottom) |
| | * | A01-1077-02 | Metallic cabinet (Top) |
| | * | A20-7023-03 | Panel |
| | * | A23-1517-03 | Rear panel |
| | | B04-0404-03 | Speaker grill |
| | * | B40-3948-04 | Model name plate |
| | | B43-1098-04 | Badge |
| | * | B50-8301-00 | Instruction manual |
| | | E30-1711-15 | Speaker cord (Accessory) |
| | | G10-0662-04 | Non-woven fabric |
| | * | H01-8265-04 | Item carton box |
| | * | H10-2668-02 | Polystyrene foamed fixture |
| | | H20-1433-03 | Protection cover |
| | | H25-0705-04 | Protection bag |
| | | J02-0049-14 | Foot (Rear) |
| | | J02-0423-04 | Foot (Front outside) |
| | | J02-0424-04 | Foot (Front inside) |
| | | J19-1325-04 | Mounting hardware (Panel) |
| | | J61-0307-05 | Wire band |
| | * | K29-4519-04 | Knob |
| | | N33-3006-41 | Flat head machine screw (Case) |
| | | N87-3006-41 | Brazier head taptite screw |
| | | N87-4008-41 | Brazier head taptite screw (Foot, SP) |
| | | T07-0222-15 | Speaker |
| | | X41-3060-00 | Switch unit |

SP-950 Schematic diagram



SPECIFICATIONS

| Specifications | | | | Model | TS-950S | TS-950S DIGITAL |
|--|---|-----------------------------------|------------------|---|---|--------------------|
| General | Mode | | | | J3E (LSB, USB), A1A (CW), A3E (AM), F3E (FM), F1A (FSK) | |
| | Memory channels | | | | 100 | |
| | Antenna impedance | | | | 50Ω
With Antenna Tuner 20 to 150Ω | |
| | Power requirement | K and P type | | | 120V AC ± 10% | |
| | | M type | | | 120/220V AC ± 10% | |
| | | W type | | | 220/240V AC ± 10% | |
| | | X type | | | 120/240V AC ± 10% | |
| | Power dissipation | Receive mode with no input signal | | | 110W | |
| | | Transmit mode | | | 700W (7.5A) | |
| | Operating temperature | | | | -10 to +50°C (+14 to +122°F) | |
| | Frequency stability | | | | Less than ±10 PPM | Less than ±0.5 PPM |
| Frequency accuracy | | | | Less than ±10 PPM | Less than ±0.5 PPM | |
| Dimensions (W x H x D)
(Projections included) | | | | 409 x 154 x 448 mm
(16-3/22" x 6-1/16" x 17-9/16") | | |
| Weight | | | | 23 kg (50.8 lbs) | | |
| Transmitter | Frequency range | 160m band | | | 1.800 to 2.000MHz | |
| | | 80m band | | | 3.500 to 4.000MHz | |
| | | 40m band | | | 7.000 to 7.300MHz | |
| | | 30m band | | | 10.100 to 10.150MHz | |
| | | 20m band | | | 14.000 to 14.350MHz | |
| | | 17m band | | | 18.068 to 18.168MHz | |
| | | 15m band | | | 21.000 to 21.450MHz | |
| | | 12m band | | | 24.890 to 24.990MHz | |
| | | 10m band | | | 28.000 to 28.700MHz | |
| | Output power | 1.9 to 24MHz | SSB, CW, FSK, FM | MAX | 150W | |
| | | | | MIN | 20W | |
| | | | AM | MAX | 40W | |
| | | | | MIN | 10W | |
| | | 28MHz | SSB, CW, FSK, FM | MAX | 110W | |
| | | | | MIN | 20W | |
| | | | AM | MAX | 40W | |
| | | | | MIN | 10W | |
| | Modulation | SSB | | | Balanced modulation | |
| | | FM | | | Reactance modulation | |
| | | AM | | | Low level modulation | |
| | Spurious radiation | | | | Less than -40dB | |
| | Carrier suppression (with 1.5kHz reference) | | | | More than 40dB | More than 50dB |
| | Unwanted sideband suppression (with 1.5kHz reference) | | | | More than 50dB | More than 60dB |
| | Maximum frequency deviation (FM) | | | | Less than ±5kHz | |
| | Frequency response (-6dB) | | | | 400 to 2600Hz | 200 to 3100Hz |
| | XIT variable range | | | | ±9.99kHz | |
| | Microphone impedance | | | | 500Ω to 50kΩ | |

SPECIFICATIONS

| Specifications | | | Model | TS-950S | TS-950S DIGITAL |
|----------------|------------------------|------------------------------|-------------------|---|-------------------------------|
| Receiver | Circuitry | Main | SSB, CW, FSK, AM | Quadruple conversion superheterodyne | |
| | | | FM | Triple conversion superheterodyne | |
| | | Sub | SSB, CW, FSK | Double conversion superheterodyne | |
| | Frequency range | | | 100kHz to 30MHz | |
| | Intermediate frequency | | Main | 1st : 73.05MHz, 2nd : 8.83MHz
3rd : 455kHz, 4th : 100kHz | |
| | | | Sub | 1st : 40.055MHz, 2nd : 10.695MHz | |
| | Sensitivity | SSB, CW
(at 10dB S + N/N) | 100kHz to 150kHz | Less than 2.5µV | |
| | | | 150kHz to 500kHz | Less than 1µV | |
| | | | 500kHz to 1.62MHz | Less than 4µV | |
| | | | 1.62MHz to 30MHz | Less than 0.2µV | |
| | | AM
(at 10dB S + N/N) | 100kHz to 150kHz | Less than 25µV | |
| | | | 150kHz to 500kHz | Less than 10µV | |
| | | | 500kHz to 1.62MHz | Less than 32µV | |
| | | | 1.62MHz to 30MHz | Less than 2.0µV | |
| | | FM (at 12dB SINAD) | 28MHz to 30MHz | Less than 0.5µV | |
| | Selectivity | | SSB, AM (N), FSK | -6dB : 2.4kHz, -60dB : 3.8kHz | |
| | | | AM (W) | -6dB : 6kHz, -50dB : 15kHz | |
| | | | CW (N) | - | -6dB : 250kHz, -60dB : 550kHz |
| | | | CW (W) | -6dB : 2.4kHz, -60dB : 3.8kHz | -6dB : 400kHz, -60dB : 900kHz |
| | | | FM | -6dB : 12kHz, -60dB : 24kHz | |
| | Image ratio | | | More than 80dB | |
| | 1st IF rejection | | | More than 70dB | |
| | Notch filter rejection | | | More than 45dB | |
| | RIT variable range | | | ±9.99kHz | |
| | Squelch sensitivity | SSB, CW, FSK, AM | 100kHz to 150kHz | Less than 8.3µV | |
| | | | 150kHz to 500kHz | Less than 2.5µV | |
| | | | 500kHz to 1.62MHz | Less than 10µV | |
| | | | 1.62MHz to 30MHz | Less than 0.5µV | |
| | | FM | 28MHz to 30MHz | Less than 0.32µV | |
| | Output | | | 1.5W across 8Ω load (10% distortion) | |
| | Output load impedance | | | 8Ω | |

Notes

1. Circuit and ratings are subject to change without notice due to advancements in technology.
2. Remember to keep the transmitting output power within the power limitations of your license.

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